THE SUBMARINE WARFARE. *See p.* 540.
THE DESIGN AND PROGRESS OF THE FLOATING FRAME GEAR (Illus.). *See p.* 548.

Physical & Applied Sci. erials

# SHIPBUILDING AND SHIPPING RECORD

A JOURNAL OF SHIPBUILDING, MARINE ENGINEERING, DOCKS, HARBOURS AND SHIPPING

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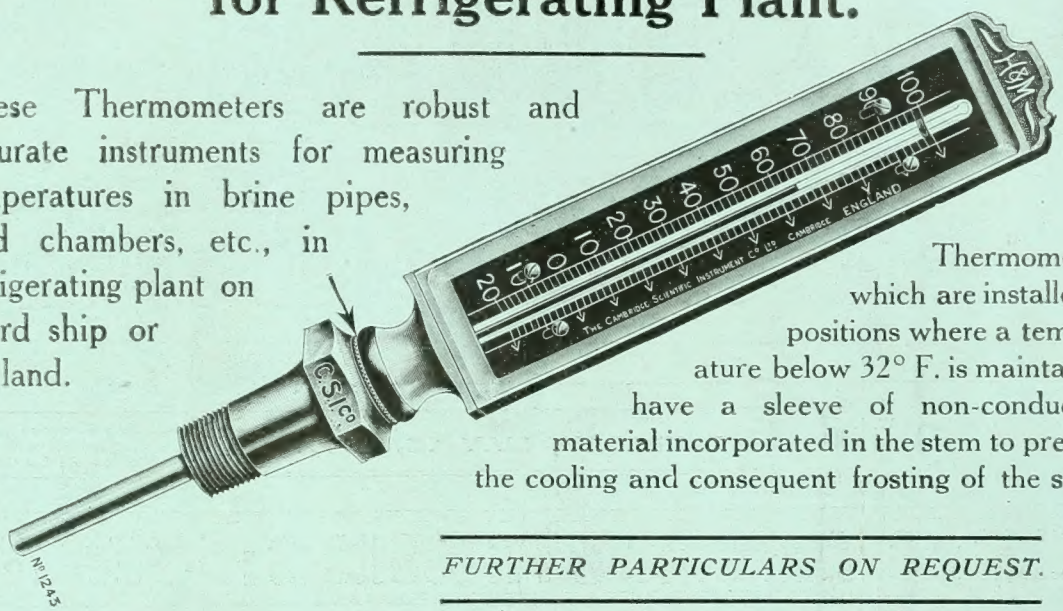


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SIR ROSSLYN WEMYSS, the First Sea Lord of the Admiralty, has opened up visions of a great and glorious future for the British mercantile marine, in which that service should be a sister service to the Royal Navy. Speaking at the annual meeting of the Mercantile Marine Association, the First Sea Lord paid an eloquent tribute to the gallantry and devotion to duty which had been displayed throughout the war by the officers and men of the merchant service, a tribute which was also paid by Admiral Sir David Beatty in a letter read at the meeting, in which he sent greetings from the officers and men of the Grand Fleet to "our brother sailors" in the mercantile marine. Dealing with the association between the two services which the war has thus established, Sir Rosslyn expressed the opinion that it was almost incredible that the association should ever be broken. At present, however, it should be remembered, he said, that the association is only one of sympathy, and is only moral, there is no binding association between the two services. He expressed the hope that in the future something more tangible will bind them together, and suggested something which might perhaps spread in the merchant marine a little of that organisation and kindly British discipline for which every man is the better and nobody the worse. He further assured his audience that if something practical could be effected it would have the sympathy of Whitehall. We feel, however, that whilst much may be said in favour of a unification between the personnel of the two services as regards training, discipline and conditions of service, it may be difficult to obtain these desirable ends without a certain Governmental control of the ships themselves, and shipowners are hoping that after the war they will be left free to manage their ships in their own particular way.

**Sister Services.**

It is difficult to see that the Courts could have come to any other decision than they have respecting the payment of income tax in the case of Meek and others *v.* the Port of London Authority. When the old dock companies were transferred to the Authority the latter was strictly enjoined by the terms of the Act of Parliament to continue the conditions of service and emoluments to employees who were taken over. Some of the dock companies had, in fact, paid the income tax of their servants. The Authority decided in 1911 to discontinue this practice so far as income-tax paying officials at that time were concerned, and in lieu thereof to pay each year a lump sum, calculated on the average tax of the ten previous years. The employees who raised the present litigation did not come within the terms of this arrangement. They only became liable for income tax at a later date owing to promotion or advance of salary, and they claimed that the old arrangement by which salaries should be paid tax free should be observed. The Court of Appeal, upholding the judge in the Chancery Division, has held that they were not entitled to this claim. They had in accepting promotion and advanced salaries entered into new contracts at law with the Port Authority, and they had full notice that the practice of paying income tax on the part of the latter would not be continued.

**Port of London Salaries.**

Owing to the rapidity with which the last Military Service Act has been brought into operation, the issue of protection certificates to skilled workmen in protected industries who come within the new age limits has not been wholly accomplished before the calling up of the new classes for medical examination has commenced. In these circumstances the Ministry of National Service has given assurances in Parliament that these men are not to be called up for service, notwithstanding the fact that they do not yet hold certificates. This arrangement is as it should be, and the terms of Mr. Beck's answer, which we quote in "Questions in Parliament," should be noted by employers and workmen alike. Departmental instructions have been given for the preparation of the certificates, and the quicker they are actually issued the less chance will there be of any misunderstanding. Sometimes the real meaning of protection certificates is forgotten by some of the people to whom they are issued. They are given in order that those who receive them may perform work of vital national importance, of value equivalent to service in the field. If that work is not honestly rendered, if time is heedlessly lost, then the reason for granting the certificate in a particular case is gone. We were recently reminded in the House of Commons that men of military age who persistently keep bad time are liable, after having been afforded an opportunity for explanation, to have their protection certificates cancelled.

**Protection Certificates.**

If a supply of boys for the sea service is to be maintained, special schemes will have to be organised under the Education Bill. Otherwise the arrangement requiring part time attendance at continuation schools until the age of 18 will prove an insuperable obstacle. Mr. Leslie Scott deserves the thanks of all interested in shipping for the moderate and convincing way in which he presented this problem during the debate on the Education Bill last week. The strength of his case has fortunately been recognised by Mr. Herbert Fisher, the President of the Board of Education. Mr. Scott's plea for special treatment of this aspect of the educational problem rests on the fact that some five to nine thousand boys are annually required for the sea service, that attendance at continuation classes is obviously out of the question for them, and

**Boys for the Sea Service.**

that an extension of institutions like the National Sea Training Institution at Liscard, already recognised by the Board of Education, presents the readiest solution of the difficulty. At these, the boy might pursue a full time education to 16 instead of a part time education to 18. Shipowners whom Mr. Fisher has consulted are agreed that this is the only way in which the Bill can be made applicable to the mercantile marine, and he is in consultation with the leaders of the shipping industry, the Board of Trade and the Admiralty on the subject. There are, of course, questions of local finance involved, but it looks as if the arrangement for which Mr. Leslie Scott asked will in principle be carried out.

**Technical Education.**

If a certain section of the House of Commons had had its way last week, injury would have been done to the proposals contained in the Education Bill for the development of continuation schools. This section sought to banish from them vocational education as contrasted with what it called liberal education. The effect of this one-sided view would have been to withhold in a large measure from boys who are destined, say, for engineering, systematic instruction in the technical processes on which their life is to be spent. It would not be in the interest of an educated democracy, as the President of the Board of Education aptly remarked, that there should be no connection between the instruction in the continuation schools and the lives which the pupils were afterwards to lead. We do not see that vocational or technical education need in any sense be illiberal. Science and applied science indeed are at least as important towards efficient modern life as many of the subjects which we know as literary, and if these are taught in relation to industry and technical processes in which the pupil is engaged, they gain in his mind a fruitful reality. Technical and scientific instruction does foster certain valuable qualities of mind, accuracy, patience, observation, and so on. All that may be said from the point of view of pure education. Industry also has its claims, as on industrial and technical fitness the future of the country largely depends. To ignore this in the education of our people is sheer foolishness.

**Writing Down Goodwill.**

At the annual meeting of John I. Thornycroft & Co., Ltd., Mr. John E. Thornycroft directed attention to the interesting fact that goodwill, patterns, drawings, and patent rights now stood in the books at the purely nominal figure of £1,000. As to the advisability of eliminating goodwill from the assets there would probably be, he said, differences of opinion, but the important fact was nevertheless not to be overlooked that in respect of, at any rate, two of the branches of the business, the goodwill had been lost through the State's monopoly of their resources. The differences of opinion which Mr. Thornycroft had in his mind were, no doubt, actuarial. The average practical man, who is not an expert accountant, will almost certainly approve the action of writing down goodwill to a nominal figure, for, as a rule, his common sense induces him to prefer reality even in a balance-sheet. He is bound, however, to have some new thoughts upon this very old question. Practically all the United Kingdom's controlled firms have lost the goodwill which they had built up, and are faced with the prospect of beginning all over again when the war comes to an end. The loss has not been due to any deficiency of their organisations, but has been brought about almost wholly by the pressure of national necessities. We do not suggest that the matter is one calling for State compensation, although a good claim of that sort might be almost established. But the position certainly calls for much more sympathy towards the contract industry than the State in its reconstruction projects seems to be disposed to give. For many concerns—even concerns which have apparently done very well on war work—starting all over again will be a serious business.

**One Risk, One Policy.**

In our note last week on that obscure document the marine insurance policy, we referred to the agitation for a standard form of policy which was carried on some time ago. Although this agitation came to nothing so far as its main object was concerned, a result of some importance was obtained in the way of getting some insurance companies to adopt a common form of policy to which they could all subscribe. This came about, not so much to simplify the working of the policy as to obviate the necessity of each company preparing a separate document for the same risk. Thus the owner of an insured vessel could request his broker to obtain a single policy subscribed by the companies interested, instead of having a separate policy from each company to the amount of its line. In this arrangement practically all leading companies were interested. The simplification thus obtained was doubtless an improvement, but unfortunately no machinery exists for the collection of claims and returns except by submission of the document to each subscribing company in turn. This proved a source of delay in getting settlements through, and we believe that after a few insurances were placed in the manner indicated, the practice of issuing these joint policies fell into disuse through lack of support.

**Marine Insurance After the War.**

The problem of commerce after the war and the conditions which will then prevail are no less interesting to the marine insurance market than to any other national industry. Points which must be considered in this connection differ in some degree from those which affect other businesses. In most commercial enterprises there is some indication of an outlet for the energies which have been generated by war conditions. Munition works are in many cases factories diverted from their proper use to the manufacture of weapons and guns. The demands of civil reconstruction after the war guarantee such works a sufficient employment after reversion to their original state, or a further diversion into new lines of manufacture. This is also true of other businesses at present occupied on war work. With marine insurance, however, there is every prospect of a large falling off in the amount of business to be done. It is true that reconstruction will mean a good deal of carriage by sea, bringing with it an increase in the premiums earned in this class of business. These premiums, however, are the only bright spot in an otherwise depressing outlook. The discontinuance of war-risk premiums will mean a large decrease in the receipts of the insurance market, and it behoves underwriters to see that when this slump arrives they are in a position to withstand the bad period which appears to be inevitable.

**Economising Ships' Space.**

Several times during the past few months, and in these columns, too, suggestions have been put forward with a view to making the most of the cargo space on shipboard. It is true that, occasionally, one hears of a vessel that arrives from overseas ports only partly loaded, but these cases are, fortunately, not frequent. On the whole, it may be said that the utmost advantage is taken of the accommodation available, and, as the result of recommendations that have of late been adopted, it is probable that there will be less waste than ever. For instance, frozen meat from Australia is often boned before shipment, a method which makes it possible to ship about 30 per cent. more weight in a given space than where whole carcases are loaded. Australian farmers have also agreed, with a similar object in view, to increase the weight of wool bales, and it is well recognised that in empty state-rooms and cabins all sorts of commodities may be stowed. One of the latest proposals was that cotton tonnage would be of greater service if the bales were more compressed, notwithstanding

that some of the present appliances would have to be scrapped. We now hear that action has been taken in the matter. Exporters in the United States, especially in the South, have led the way in this reform, and it is understood that the American Department of Agriculture has succeeded in inducing ginners to adopt boxes of a uniform size of 27 in. by 54 in., and that this compression will be uniform throughout the cotton belt. The railway companies are taking steps to make the new regulations effective in time for the coming crop. Apart, too, from the question of sea transport, the alteration will, it is thought, result in relieving the railway congestion.

**A.S.E. and Employers.**

Mr. Brownlie, the chairman of the Executive Council of the Amalgamated Society of Engineers, is, as a rule, so careful about his facts, that it gives us something of a shock to find him at fault. In the course of a discussion to members on the need for greater interest in the question of Parliamentary representation he alleges that "the forces of capitalism and reaction are organised as they have never been organised before, and the only way in which we can hope to confront them successfully is by improving and making the fullest possible use of our own organisation." The suggestion that the Engineering Employers' Federation is a capitalist and reactionary body in the Trade Union sense of the term is nonsense, and nobody knows that better than Mr. Brownlie. Moreover, it is well within his knowledge that the Federation is neither better nor worse organised than it was in 1914. The simple truth is that with jobs more plentiful than engineers the Amalgamated Society is of a mind to act more aggressively, and in order to justify its new attitude it is re-imagining all the old, untrue things about employers. The A.S.E., like any other trade union, is entitled to do what it chooses—or rather what it can—in the matter of Parliamentary representation. But in order to secure a suitable resettlement of industry after the war there is no reason why it should be directly represented in Parliament at all. A series of joint conferences with the engineering employers will suffice; but it can hardly be called a promising preliminary to the arrangement of meetings of the kind officially and publicly to describe employers as reactionary.

**The Shipbuilding Output.**

There is a tendency in a great many quarters to exaggerate the importance of figures relating to shipbuilding output when compiled for short periods. This faculty together with irresponsible newspaper paragraphs which promised a record output for April may be held responsible for the manner in which the figures for last month were received generally. While we do not profess to minimise the effect of a drop of 50,000 tons, it is quite evident from the statement by the Controller-General that no other result could have been expected, considering the demands made at the same time upon the dual industries of shipbuilding and marine engineering for repairs. We are assured by Lord Pirrie that the number of damaged vessels returned to service shows a marked increase amounting, in fact, to 40 per cent. since January. Had the public been aware that launchings during January and February were, like the completions, poor, then it would have been obvious, at any rate, to the more enlightened, that at some date in the near future the output reckoned in completions would show a reaction. This has taken place and is demonstrated by the completion of 111,533 tons during April compared with 161,674 in March. The result is, however, considerably better than April of last year when the output was 69,711 tons and 749,314 represented a 12 months output at the same rate. It will be seen from the figures published on page 542 that the rate of annual output is steadily progressive. It is practically a year since the Admiralty Controllership was instituted, and one is entitled to expect a considerable improvement in output from now onwards.

**German Shipbuilding.**

In a recent issue *Vorwärts* unintentionally confirms the view taken by most Britons that German talk about the activity in spite of the war of German merchant shipbuilding is just ordinary lying. *The Times* correspondent at Amsterdam tells us that in an article on the subject the Social Democratic organ gives practically the same details as the *Leipsiger Volkszeitung* gave in 1916, and, as was pointed out at the time, these related almost exclusively to work which was in hand at the outbreak of hostilities. That is true even of the few additional details given by *Vorwärts*; both the 17,000-ton cargo liners and the new Hamburg–South American passenger liner were included in the Danish and Italian versions of the story. It is, in fact, years ago since the sister ship to the *Cap Finisterre* and the *Cap Trafalgar* was laid down. The anxiety of our principal enemy to reassure his civilian population on the shipping question is the measure of his alarm at the actual prospect. For reasons which are not obscure he cannot make up his own tonnage shortage in time, and, thanks to his policy of sinking everything at sight, neutral maritime countries need every ton they possess for the transport of their own materials. The submarine piracies have, of course, been serious for ourselves and our Allies; but as things are going, and provided our shipyards do their duty, it is practically certain that the greatest sufferers from the effects of the ruthlessness will be the Germans themselves.

**American Shipbuilding Outlook.**

The cablegrams received during the last few days from across the Atlantic all deal hopefully with both the shipbuilding position and the twin problem, the submarine menace. The boastful predictions of a huge tonnage output made a year ago, are absent, bu tthe more conservative estimates now made appear all the more likely to be realised. The Director-General of the Emergency Fleet Corporation has completed a survey of the shipbuilding situation, and states that he has every reason for optimism. It is asserted that the tonnage output for the year will be 4,000,000 tons deadweight. Estimates prepared by the Shipping Board for submission to Congress for the coming fiscal year suggest that a much larger output is intended. The amount required for merchant shipbuilding alone is £500,000,000, which on the existing cost basis of £50 per ton would provide 10,000,000 tons of shipping. As showing the greater effectiveness of the measures taken to counteract the submarine peril, it is announced that the war risk insurance rates on hulls and cargoes of American steamers travelling through the war zone from American ports to ports of the United Kingdom and on the Atlantic coast of France has again been reduced. The rate which was 6½ per cent. in August, was lowered to 5 per cent. in October, in November it was again lowered to 4 per cent., in March to 3 per cent., and now it is reduced to 2 per cent. The 3 per cent. rate remains in force for the Italian, North African, the French Mediterranean and Greek ports.

**Motive Power for Tankers.**

It has long been a source of wonder to many that with fuel available at the lowest possible price, oil tank steamers should be propelled by means of steam engines—albeit having boilers which are oil fired—instead of with Diesel engines. The reason for this apparent anomaly is not so much that the Diesel engine is not sufficiently reliable, but rather because it is the established practice to build oil tankers of such large dimensions that the power required to drive them lies beyond the size of Diesel engines so far built for marine work. Oil tank vessels of 18,000 tons deadweight carrying capacity are under construction, and it is apparent that even with twin screws the size of Diesel engine required would be far greater than any in use at the present time. This fact was emphasised at the recent meeting of the Eagle Oil Transport Company, Ltd., when the chairman, Capt. the Hon. B. C. Pearson, stated that after careful consideration between the company's technical staff and

various builders it had been decided to install geared turbines and oil-fired boilers in the new vessels now building for the company. Engineers may disagree with the sweeping assertion that at no distant date internal-combustion engines of the Diesel type would be the established practice for marine purposes, although they will recognise that there is justification for the statement that the large size of the company's new vessels and the horse-power correspondingly required precludes the use of the Diesel engine in the present case. Whether the adoption of geared turbines with oil-fired boilers is merely "an eminently satisfactory half-way house" in marine engineering practice, time alone will show.

## THE SUBMARINE WARFARE.

A CURIOUS feature of most German official and semi-official allusions to the U-boat warfare is that they assume a total ignorance on our side of what is happening. We do not know how many Allied merchant ships nor how many neutral merchant ships are being sunk; and we are—so, at any rate, Berlin's brainy statistical strategists would have the world believe—densely ignorant as to the real losses of German submarines. Only a pure Prussian could think of challenging our official and other statements about our own losses, for obviously we are in a much better position to ascertain them than the commanders of "attack and submerge" undersea craft. But we really do not much mind his pity of our alleged lack of knowledge and his gross exaggeration of our misfortunes, because the policy of which they are expressions is bound in the end to be the undoing of the marine cant. When the truth is available to the people of the Fatherland, von Capelle and his associates will have some inconvenient questions to answer.

Having said that we are necessarily in a better position to ascertain our losses than the Germans are, we are bound also to say that our facilities for the ascertainment of U-boat losses are not so good as those of our enemy. But we venture to raise a point which in our opinion the naval authorities at Berlin cannot afford to ignore. Sir Eric Geddes has more than once publicly stated what we believe the German submarine losses to be. Von Capelle and his friends have, as a matter of course, denied the accuracy of the statement, but only in general terms. No one has ventured to say what the actual losses are—in other words, to set figures against figures as has been done in the case of merchant ships sunk. Why do they hesitate to do so? If the position and prospects are as good as they say they are, the effect of the publication of the actual figures would be heartening rather than disheartening to the German public. We invite von Capelle to publish them. His answer to our appeal may be that to do so would be to give us valuable information. But, as we suggest, if the news is as good as he wishes the German people to believe, it would be serving us very little to give it.

Von Capelle is not quite so expert in dazzle work as some of his friends, and it is, therefore, possible in the case of his speeches to see a good deal of the reality. In the Reichstag last week, for example, he declared that the reports for April were again favourable. "Naturally," he went on to say, "losses also occur, but the main thing is that the increase of U-boats exceeds the losses." Quite clearly the conclusion which Germans were invited to draw from that was that the building of U-boats in excess of the losses is continuous and steady. All that he actually said, however, was that in April the new vessels exceeded the lost ones. It is, of course, useless to ask for figures which we are unlikely to get; but has the gallant Admiral sufficient nerve left publicly to say as much about any or all of the earlier months of the year?

In a statistical exercise of this description it is, of course, foolish to take so short a period as a month, even if you are a German bent upon making the most of a doubtful argument. Von Capelle proved that it was so when he turned from consideration of U-boat losses to consideration of United Kingdom shipbuilding. Nobody on this side of the North Sea regards the present rate of output as highly satisfactory, but it would not be true to say that anybody sees significance in the appeal to the workers to exert themselves. The appointment of a Controller-General of Merchant Shipbuilding and the appeal to all concerned to increase output hang together. Moreover, the knowledge that the Germans see something to be pleased about in an alleged failure of the appeal so far as Labour is concerned, is bound to have a stimulating effect on the workers—who have, as most readers are aware, the full measure of the enemy.

For a reason, which is not obscure, we are, however, less interested in von Capelle's dependence upon a lack of patriotism in our workers than we are in the foolish way in which he harps about the lowness of our April output. As compared with March, there was, he pointed out, a decline of 50,000 tons, or 40 per cent. But in leaving it at that he ignored figures given in the official return which would have carried the bottom clean out of his argument if he had used them. As we have suggested, our position leaves a great deal to be desired. But we are not going from bad to worse, as the gallant Admiral endeavoured to make his hearers believe. On the contrary, as the figures relating to periods of 12 months show, our position is steadily improving, and it is to make fools of the German public to withhold the information from them. Still, that is the Berlin Admiralty's look-out, not ours, and our enemy is welcome, so far as we are concerned, to its risks.

All the Prussian politicians who took part in last week's Reichstag debate are not, of course, so well informed on the subject of the U-boat warfare as von Capelle is. Some of them, as a matter of fact, with an inclination to bloodthirstiness which seemed to be wasted in Berlin, showed that their knowledge of naval warfare was practically nil. Herr Kapp was, for instance, responsible for this:—

"In view of the great success of our U-boats, we must not allow ourselves to be induced, on the conclusion of peace, to agree to restrict the use of U-boats by international regulations. We need this weapon for the maintenance of German power at sea. The destruction of the British flag is the main aim of our U-boat war."

Herr Kapp forgets that when peace comes Germany will have to resume her navigation of the surface of the sea or go to the wall as a great Power. If that were not clearly the case, we should ask this terrible fellow who lives in Berlin, and not on the Western Front, what he thinks British submarines would be doing to German merchant ships while his U-boats were destroying the British flag.

## SHIP CALCULATIONS.

WHILST it is most desirable that all calculations in connection with ships should be accurate, it is, at the same time, unnecessary to strive after a degree of accuracy which is beyond all practical application. It is not unusual to observe on displacement sheets the displacement in tons given to three decimal places, nor is it uncommon to find trial results which simply astonish with their apparent accuracy. For example, the power developed on trial by the United States battleship *New York* has been given as 16,947·29 i.h.p.; the revolutions of the destroyer *McCall* were 847·912 at a speed of 30·659 knots. When it is remembered that it is not possible to guarantee the accuracy of power records to within 5 per cent., the futility of such a statement as that of the *New York's* performance is evident. Further, the figure in the third decimal place in the revolution record of the *McCall* represents one-seven-thousandth of a second in time. Had the revolutions been stated as being 848 and the speed 30·66 knots, the essential accuracy would have been unaffected, and those responsible for the figures would not have left themselves open to the jibes of critics.

In connection with the design of ships, it is necessary to make all sorts of calculations. Weight of structure, displacements, water-line areas, coefficients of fineness, coefficients of performance, &c., are all required. In the first of these, it is possible to get the exact weight of some of the items, but there is room for a considerable

amount of error in the estimate of others. Calculations of displacements, &c., which relate to the form of vessels can be made with a great degree of exactitude, and it is mainly in this connection that the following remarks are made.

Some time ago we advocated the use of Tchebycheff's rule for calculations of displacements, areas, coefficients, and stability. In a discussion which followed, it became evident that the application of the trapezoidal rule was by no means uncommon in this country. There is no doubt, however, that Simpson's rules are used by the great majority of naval architects. It is possible that the latter afford greater accuracy than do either Tchebycheff's or the trapezoidal, and, unless these can offer some compensations in the way of labour saving, their adoption is undesirable. It is considered by some that they do offer such, and that the accuracy afforded is sufficient for all practical purposes.

In the use of Simpson's rules, it is customary to state the offsets to two decimal places, and it is evident that were one decimal figure adopted, a deal of work would be saved. Would such be sufficiently accurate? All experience goes to prove that the offsets taken to one decimal place do afford sufficient accuracy. Before giving an example of calculations done by using both, it might be desirable to examine the sources of inaccuracy which arise in spite of the most careful measurement. D. W. Taylor enumerated these as follows:—(*a*) The sections plotted do not represent exactly the shapes of the ships as built; (*b*) the ordinates for calculations cannot be measured exactly; (*c*) the methods by which the volume of the vessel is calculated from the ordinates are necessarily approximate only; (*d*) the density of the water in which a vessel floats is not accurately known, only in exceptional cases; (*e*) the curve of displacement is necessarily approximate, and it cannot be read from exactly; (*f*) when a ship is afloat, the mean draft can be determined only approximately.

With so many possibilities of minor errors creeping into estimates of the true displacements of ships, it does not appear to be reasonable to attempt to secure an arithmetical accuracy out of harmony with the nature of the problem. Apart from this, it has been found from actual examples that the results given by using offsets to one decimal place compare very closely with those given by the use of offsets having two or three decimal places. In the case of a mathematically-lined ship, with an exact displacement of 10,177·5 tons, the displacement was worked out by three separate draughtsmen from a body plan drawn to a scale of $\frac{1}{4}$ in. = 1 ft. By using Simpson's rule and the ordinates given to two decimal places, the displacements obtained by the three men were respectively 10,176·3, 10,169·4 and 10,171·6 tons. By using ordinates to one decimal place, only the displacements found were 10,175·1, 10,174·1, and 10,174·3 tons. From these results, it appears that an error of only ·03 per cent. was entailed when using ordinates to one decimal place only. By entering to the nearest tenth, the maximum error possible for a single ordinate would be ·05 of a foot. When it is considered that the errors are as likely to be positive as negative, it is evident that the resulting error, when all the figures are assembled, must be very small. The danger of a large majority of ordinates having fractions on the same side of ·05 is not great. From personal experience and from published examples, we are convinced that the simplifying of displacement calculations by the use of ordinates to one decimal place only is thoroughly justified.

With regard to two of the sources of inaccuracy which enter into the computation of the actual displacement of vessels, viz.:—That the sections as plotted do not necessarily represent exactly the shape of a ship as built, and the difficulty of determining the true mean draft of a vessel afloat, the following may afford illustration. In vessels which have been measured, there have been differences found of more than $\frac{3}{4}$ of an inch in several places between the designed form of section and the actual ship, and this condition existed in a case where it was known beforehand that such measurement would be taken. In observation of draft, also, it is very easy to err by $\frac{1}{2}$ in. from the actual draft. In a large vessel this might represent as much as 50 tons displacement, whilst a slight hog or sag, observations of which are impossible, might still further add to the difficulty of arriving at the actual weight of water displaced.

In several of the calculations which are made in shipyards, broad assumptions are made which make ridiculous the straining after extreme accuracy. For example, in questions of subdivision, the adoption of certain definite permeability values give standards which must be held to, but which may be very far off the truth in particular cases. A broad interpretation of the methods of correction is, therefore, advisable.

A reasonable measure of judgment should always be observed in making the various calculations which are required, and every method which ensures the minimum of labour and also the necessary degree of accuracy should be adopted. The fewer the number of figures used in a calculation, the greater chance there is of obtaining arithmetical accuracy, and the values are practically unchanged by the adoption of broad methods of calculation.

## THE STEERING OF SHIPS.

ALL ships must possess the power to manœuvre, but exactly to what extent will depend on the type of the vessel and the use for which it is intended. Although all vessels possess the power to manœuvre it can hardly be said that the majority of ships are really easy to handle. It is true they are handled and handled effectively, but nevertheless captains often wish that they had more control over their vessels than is given them even by twin propellers and the ordinary rudder.

It will not be without interest to examine what takes place when helm is given to a ship. As the rudder at first goes over, the ship for the moment continues on her course and there is a sudden concentration of water between the rudder and the deadwood aft. This sets up an increase of pressure on both the rudder and deadwood which pushes away the stern of the ship in the direction opposite to which the rudder is turning. The ship also moves bodily outwards. The instantaneous effect, therefore, is to move the ship along a course which is curved in the opposite way to that in which the ship is required to turn finally. In a short time the ship takes up a definite but not really steady swing. This swing is helped by the pressure on the bow, the excess pressure on the deadwood aft being reduced. Shortly after this, the vessel settles down to a steady swing, the pressures on the bow and the rudder turning her, but the pressure on the deadwood aft is now on the opposite side to what it was originally, with the result that it retards the turning of the vessel. Equilibrium must eventually be established when the middle line of the ship takes up a definite angle to the direction in which the centre of gravity of the ship is travelling. This angle is called the Drift angle. The distance between the original course of the vessel and the position of the ship when she is moving in exactly the opposite direction to her original one is called the tactical diameter of the vessel. If this is to be small the deadwood aft should be well cut away.

When the ship settles down on her turning circle, about the centre of which she rotates, there is some point—usually well forward of amidships—on the vessel which only has a motion along the middle line, every other point on the vessel really moving in some other direction. This point is called the pivoting point, and the resistance of the various parts under water to turning depend on their distances from this pivoting point. Since the pivoting point is forward of amidships it follows that the aft deadwood is more effective in reducing turning than the forward deadwood.

When the rudder is first put over, the centre of pressure on it is below the centre of pressure of the force opposing the lateral motion of the ship, and in consequence the vessel at first heels towards the centre of the turning circle. When steady motion is established, centrifugal force acts on the vessel through a point generally

above the water-line and certainly above the centre of lateral resistance. This force is more powerful than the pressure on the rudder, with the result that the vessel heels outwards. Although this is very generally true, it would be possible to conceive of a case where the pressure on the rudder was so great and relatively high, and the centre of gravity of the ship, through which the centrifugal force acts, so low, that the ship might heel inwards on the turning circle instead of outwards.

It is, of course, well known that wind will affect the steering of a ship. If she is moving with the wind on the beam, the centre of pressure of the wind force on the above-water portion may be forward or abaft the centre of lateral resistance of the under-water portion. In any case, helm will have to be carried one way or another to correct the tendency of the wind to turn the ship. This will always decrease the speed of the vessel. In one particular case, it so happened that the centre of pressure of wind was abaft the centre of lateral resistance, the deadwood aft was cut away, bringing the latter point further forward, making matters worse, so that a good deal of helm had to be carried with a beam wind.

It is generally understood that wind can affect the speed of a ship a good deal. If the wind is directly ahead, it will retard the motion of a ship considerably by direct pressure, although it will not affect the helm. If it is on either bow, it will not only retard the speed on account of its direct pressure, but also by the fact that helm will have to be carried to keep the ship on a straight course. If the wind is directly behind the ship, it will, of course, assist the speed of the vessel. If it is on either quarter, it will increase the speed by direct pressure, but retard it because helm will have to be carried to keep the vessel straight. With wind directly on the beam, helm will practically always have to be carried, and the speed of the ship wlll be retarded on this account, although the wind pressure has no direct effect.

Rudders are divided into several classes. The most common form is the ordinary mercantile rudder in which the whole area of the rudder is abaft the axis of rotation. For many years the most common type of rudder in war vessels has been the balanced rudder. This takes several different forms. It may be completely balanced and supported by the rudder head and a bottom pintle or it may be completely balanced and also completely underhung and supported from two points on the rudder stock. There is another form of rudder described as a semi-balanced, in which a small portion only of the rudder area is forward of the axis, the rudder being pivoted on the rudderhead and on one or more pintles, the portion of the rudder below the bottom pintle being completely underhung.

The ordinary mercantile form of rudder remains in general use because it is easily handled, although it is not so economical in form as some of the other types ; speeds of merchant vessels being generally small, does not make the rudder unmanageable in size. The steering gear for it has to be larger and heavier than the more effective rudder of the balanced or semi-balanced type, all of its area being abaft the axis the twisting forces acting on it are much greater than with the latter types. For vessels with cruiser sterns—which includes practically all war vessels—the balanced type of rudder becomes almost a necessity, although in the last few years certain merchant vessels fitted with cruiser sterns have still been given the ordinary merchant type of rudder, and it is doubtful if there is any reason to depart from this form in general practice. If particularly rapid manœuvring is required there may be some reason for it.

There is no very accurate way of working up the strength of rudders from first principles, as the forces acting on them have never been very accurately determined. Formulæ are used for this purpose in certain cases which are admittedly comparative. For the majority of merchant vessels the necessary rudder sizes are all given in the rules of the Registration Societies. It can hardly be said that a rudder is particularly effective in controlling a ship, in fact, if specially delicate manœuvring is required in a vessel, twin screws must always be fitted to assist the rudder. Whether more effective methods will be devised for controlling the motion of a ship must be left to the future to decide, but any improvement on the present system would certainly be sure of a warm welcome.

## PUBLICATIONS RECEIVED.

*[A short notice of any publication does not necessarily preclude the subsequent appearance of a longer review.]*

**The London Chamber of Commerce.** Thirty-sixth Annual Report of the Council. Transactions of the year 1917. 6 in. × $9\frac{1}{4}$ in. × $\frac{5}{16}$ in. 120 pp.

The Annual Report of the London Chamber of Commerce, just received, draws attention to the growing dissatisfaction with the methods of certain Government Departments in controlling trade and industry without due regard to the legitimate interests of merchants and traders generally and to the skilled services which they were prepared to place at the disposal of the Government. It further draws attention to the steps which are being considered with a view to the re-establishment and development of trade after the war, and deals seriatim with the activities of the numerous committees representing different departments and sections of the Chamber.

## NEW MERCHANT SHIP CONSTRUCTION.

The following announcement has been issued by the Secretary of the Admiralty :—

1. World.—Three Months Ended March 31, 1918.

The tonnage of merchant vessels completed in the United Kingdom yards and the tonnage launched in Allied and neutral countries during the years 1915, 1916 and 1917, and the quarter ended March 31, 1918, is as follows :—

| Period. | United Kingdom. Gross Tons. | Allied and Neutral. Gross Tons. | World. Gross Tons. |
|---|---|---|---|
| 1915... ... ... ... | 650,919 | 551,081 | 1,202,000 |
| 1916... ... ... ... | 541,552 | 1,146,448 | 1,688,000 |
| 1917... ... ... ... | 1,163,474 | *1,774,312 | *2,937,786 |
| 1918 (1st quarter) ... | 320,280 | 544,327 | 864,607 |

* Adjusted to include certain vessels advised since the issue of the Parliamentary White Paper in March, No. Cd. 9009.

2. United Kingdom.—April, 1918.

The tonnage of merchant vessels completed in United Kingdom yards and entered for service during the month of April, 1918, compared with preceding periods, was as follows :—

| Completions for month ending. 1917. | Gross Tons. | Completions for 12 months ending. 1917. | Gross Tons. |
|---|---|---|---|
| April 30 ... ... | 69,711 | April 30 ... ... | 749,314 |
| May 31 ... ... | 69,773 | May 31 ... ... | 773,116 |
| June 30 ... ... | 109,847 | June 30 ... ... | 833,863 |
| July 31 ... ... | 83,073 | July 31 ... ... | 865,147 |
| August 31 ... ... | 102,060 | August 31 ... ... | 928,470 |
| September 30 ... | 63,150 | September 30 ... | 957,185 |
| October 31 ... ... | 148,309 | October 31 ... ... | 1,045,036 |
| November 30 ... | 158,826 | November 30 ... | 1,133,336 |
| December 31 ... | 112,486 | December 31 ... | 1,163,474 |
| 1918. | | 1918. | |
| January 31 ... | 58,568 | January 31 ... | 1,173,953 |
| February 28 ... | 100,038 | February 28 ... | 1,194,540 |
| March 31 ... ... | 161,674 | March 31 ... ... | 1,237,515 |
| April 30 ... ... | 111,533 | April 30 ... ... | 1,279,337 |

It should be noted that the English practice is to express merchant shipbuilding statistics in "Gross" tons, whereas in the United States of America and some other countries the figures are recorded in "deadweight" tons, which is a much higher figure, and this should be remembered when making comparisons.

The Controller-General of Merchant Shipbuilding makes the following comments :—

The output for April, 1918, although not reaching the high figures for March, 1918, is 60 per cent. higher than the month of April, 1917. The upward tendency in the rate of annual output is steadily maintained. The launchings in January and February, 1918, were low for reasons already explained, and this is reflected in the tonnage of completions now issued.

It should be noted that the April output has been achieved

notwithstanding the very large increase in the merchant ships which have been repaired and returned to service. Since January the increase amounts to 40 per cent., and this work has placed a severe strain on the shipbuilding and marine engineering resources of the country.

## CARRIAGE OF EXPLOSIVES ON BOARD SHIP.

The Marine Department of the Board of Trade has issued the following instructions to surveyors.

Surveyors are informed that the following regulations should be observed when explosives are carried in ships other than emigrant ships :—

1. The explosives should be packed as required by the Secretary of State's Order, No. 7, dated June 10, 1904, relating to the packing of explosives for conveyance.

2. The stowage of the various kinds of explosives in holds of the vessels should be in accordance with the requirements laid down in the accompanying regulations as to stowage.

3. Magazines for explosives should be constructed in accordance with the specification which follows the regulations.

4. *Holds containing coal.*—No explosives should be carried in a hold containing coal, nor in 'tween decks over a hold containing coal except safety cartridges, safety fuses, percussion caps and fog signals, unless specially authorised by the Marine Department of the Board of Trade.

5. *Passengers' baggage.*—No explosives should be carried in a hold containing passengers' baggage.

6. *Lightning conductors.*—All ships with wooden masts conveying any quantity of explosives are required to be fitted with a lightning conductor at the main, and with additional conductors if specially ordered. In the case of ships built of iron or steel, and having iron or steel masts with wire rigging from the mast head making direct contact to the hull, lightning conductors are not required.

7. *Electric light wires* must be disconnected in holds containing explosives.

8. No explosives may be carried in any ships unless they have been authorised under the Explosives Acts,* or approved by the Admiralty, War Office or Ministry of Munitions.

9. Circular 1541 of November, 1913, is hereby cancelled.

### REGULATIONS AS TO STOWAGE.

(I.) The following explosives may be stowed in the same hold with one another in one magazine :—

Classes 1 to 4 inclusive and Class 6, divisions 1 and 2 : As classified in Explosives Act, 1875 ; and such explosives of division 3 as are here specified ; all fuses for shells with or without gaines, filled gaines, night tracers, portfires, percussion primers, friction and percussion tubes of firing explosives, fused shell, other than smoke, incendiary or chemical, quick-firing ammunition, bombs and grenades in boxes with their detonators, but not assembled, except smoke, incendiary or chemical.

(II.) Detonators, electric detonators and igniters with detonators attached, must be stowed in a magazine by themselves in a separate hold in which no other explosives are placed except those of Class 6, division 1.

The magazines containing those must not be less than four feet from the ship's side.

(III.) Fireworks must be stowed in a separate hold by themselves, in which no other explosives are placed except those of Class 6, division 1.

(IV.) Smoke, incendiary and chemical shells, bombs and grenades should, if practicable, be stowed on deck as far aft as possible, but if this cannot be done they should be stowed in the shelter deck, provided no dry foodstuffs are stowed there ; preference for deck stowage being given to smoke shells. A sufficient number of gas masks should be provided, and instructions as to their use given to members of the ship's crew.

(V.) No magazine need be provided for the stowage of the following explosives, viz. :—Percussion caps, safety cartridges, capped empty cases, safety fuse, cordeau bickford, electric fuses, fog signals, fuses for shell, filled gaines, slow match, quick match, portfires, electrical and shrapnel primers, tubes for firing explosives, mines and counter mines not containing their own means of ignition, filled shell, plugged or fused, but not incendiary, chemical and smoke shells, wet guncotton, depth charges filled T.N.T. amatol or wet guncotton, sweeping charges, warheads for torpedoes, hand grenades packed with igniters, but not assembled.

These articles may be stowed in the same holds as the explosives specified in para. 1, or with "Special Ammunition Stowage," which means in a compartment in which there are no matches, inflammable liquids, or other dangerous goods.

(VI.) A "hold" shall be deemed to be a space contained between two permanent bulkheads.

Deck cargo of an inflammable, corrosive or dangerous nature must not be stowed on the deck of a steamer in which explosives are carried, unless the engine and boiler spaces intervene between the holds in which the explosives are stowed and those over which the deck cargo of a dangerous nature is placed.

### SPECIFICATION FOR MAGAZINES.

1. Unless otherwise sanctioned by the surveyor, magazines are to be built in 'tween decks if possible, and must be so placed that their doors are easily accessible from a hatchway.

2. Magazines may be constructed of steel, iron or wood, provided that if of steel or iron the whole of the interior shall be thoroughly protected by paint, varnish, galvanising or other suitable coating. Provided that no gunpowder, picric acid or other bulk explosives packed in barrels be stowed in a steel or iron magazine unless the magazine is lined with wood or other suitable material.

3. Flooring of all magazines shall consist of 3 in. by 1 in. gratings with a mesh of not more than 4 in. square. These gratings should be portable, to allow access for cleaning.

4. When magazines are constructed of wood they shall comply with the following specifications, viz. :—

(*a*) The bulkheads to be formed of 1¼-in. boards secured internally to uprights 3 in. square placed not more than 2 ft. apart, running from deck to deck, and firmly secured top and bottom. Where the magazine is against the ship's sides and cargo battens are fitted, spaced not more than 9 in. apart, other lining is unnecessary.

Where cargo battens are more than 9 in. apart filling pieces shall be provided.

When on iron decks, the heels of the uprights to step on and be secured to a fir board of 1 in. thick laid on the deck.

A board 9 in. by 1¼ in. to be securely fastened to the uprights at the upper and lower ends for securing heads of shores for tomming off.

Lining of magazines is unnecessary.

(*b*) Except when built on cargo or in the square of the hatchway, a magazine need not be roofed over, provided that in the case of explosives of Classes III and IV a clear space of not less than 3 in. shall be left below the bottom of the beams of the overdeck.

(*c*) The door of the magazine shall be of substantial construction and fitted with a strong lock.

(*d*) When a magazine measures athwartships more than 40 ft. in width, a fore and aft bulkhead must be fitted, constructed of uprights 3 in. square, 3 ft. apart, extending from deck to deck, secured at the top and bottom as for side bulkheads, lined up with 1 in. boarding not more than 6 in. apart, alternately on either side of the uprights. The ship's permanent stanchions may be used in lieu of the temporary uprights when they are in proper position, and provided they are not more than 6 ft. apart.

5. Efficient ventilation into the hold shall be provided in steel or

* List of authorised explosives, published annually on January 1, are obtainable through any bookseller from H.M. Stationery Office, price 2d.

iron magazines by the provision of 2-in. holes in the bulkhead as close to the overdeck as practicable, but any deck ventilator into or immediately over a magazine to be effectively closed. Any other ventilators in the hold are not to be interfered with.

Magazines on Cargo.

6. When it is necessary to build the magazine on cargo the selected place is to be levelled off, and the bottom formed of 3 in. by 3 in. quartering, placed 2 ft. apart, covered with 1¼ in. boarding, securely nailed. Uprights 3 in. square, 2 ft. apart, running from the boards to the deck above, to fit taut and to be well driven in, cleated at the bottom and well tommed off at the top.

Remainder of magazine as previously detailed.

Portable Magazines for any Quantities up to Two Tons.

(Size in accordance with the dimensions of the packages to go into it.)

7. A frame is to be made of 2 in. by 3 in. quartering floored and boarded up with 1¼-in. boarding. Lid to be fitted with cleats on the inside to keep it in its place when shipped, and fastened with hasp, staples, and a strong hanging lock of brass or galvanised iron.

Stowage of Filled Shell.

8. Filled shells unboxed shall be securely chocked off, and when not overstowed by suitable cargo shall be covered by deals securely tommed down from the deck above.

Notes.

10.—(A) The term "'tween decks" to mean all closed-in spaces below the uppermost continuous deck which are bounded by permanent bulkheads, and through which there can be no traffic whilst at sea, and which are included in the gross tonnage of the ship. Magazines may, if sanctioned, be built in a poop when it is included in the gross tonnage of the ship, and when not so included in the gross tonnage, provided the openings are efficiently closed and such poop contains no kind of crew accommodation or stores. Magazines should not be built in any bridge house whether included in the tonnage or not. This does not apply to the stowage of smoke, inciendiary and chemical shells in the shelter deck.

(B) A cool position is to be selected for all magazines.

(C) Magazines, when not supported by other cargo, shall be efficiently tommed off.

(D) Magazines for Admiralty and War Department explosives in freight vessels are to be constructed under the supervision and to the satisfaction of the officers of the Department shipping the explosives.

(E) Wherever in these instructions reference is made to the classification of explosives, this shall be deemed to relate to the classification under the Explosives Act, 1875.

## LONDON DOCK-WORKERS' BONUS.

The Committee on Production have now issued their award on the claim for an advance of wages to dock labourers in London, which provides that:—

"Where the war advances already given to the men concerned are 5d. per hour and upwards, there shall be paid such further increase as shall bring the total war advance up to 7d. per hour.

"Where the war advances already given amount to less than 5d. per hour there shall be paid a further war advance of 2d. per hour.

"Daily workers and weekly workers shall receive advances proportionate to those granted under this award to men paid at hourly rates.

"Extra payments, if any, made for overtime or for night work, or for Sunday work, shall continue to be calculated according to the existing practice, but on the basis of the increased hourly or daily rates fixed by this award instead of the existing hourly or daily rates. The advances awarded cover, and are to be deemed to be in full satisfaction of, any claims with respect to the bonus of 12½ per cent. The new rates are payable as from the commencement of the day shift on Monday, May 6. The terms of the award are similar to those of the general award issued by the Committee on May 3, for ports other than London."

The official statement further adds that:—

"In the absence of representatives of the London employers at the hearing on April 26, the Committee are not in possession of detailed information which would enable them to make provision for any special circumstances which may exist. If, in the application of the award, there are points of difficulty upon which the parties are unable to agree, the Committee will be prepared to hear the parties thereon and give a decision."

[See letter from Viscount Devonport, chairman of the Port of London Authority, in *Shipbuilding and Shipping Record*, May 2, 1918, page 500.—Ed.]

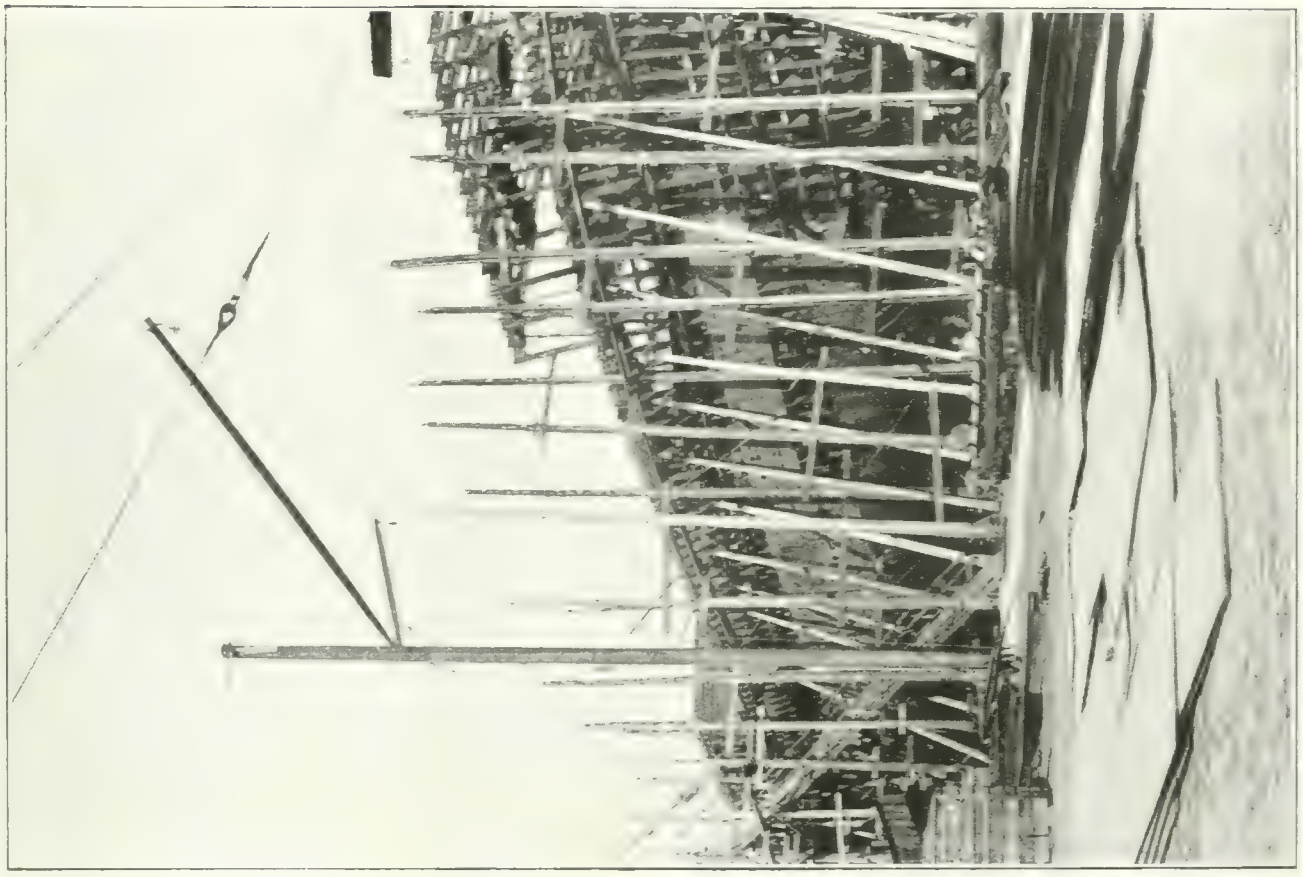
## ADMIRALTY FUEL OIL.

The Government are offering an award of £2,000 to the first person or persons who, on or before August 1 next, can obtain to the satisfaction of the Admiralty and the Petroleum Executive a fuel oil suitable for Admiralty use by the mixture of dehydrated coal tar and mineral petroleum oils. The conditions announced by the Controller of Munitions Mineral Oil Production are as follows:—

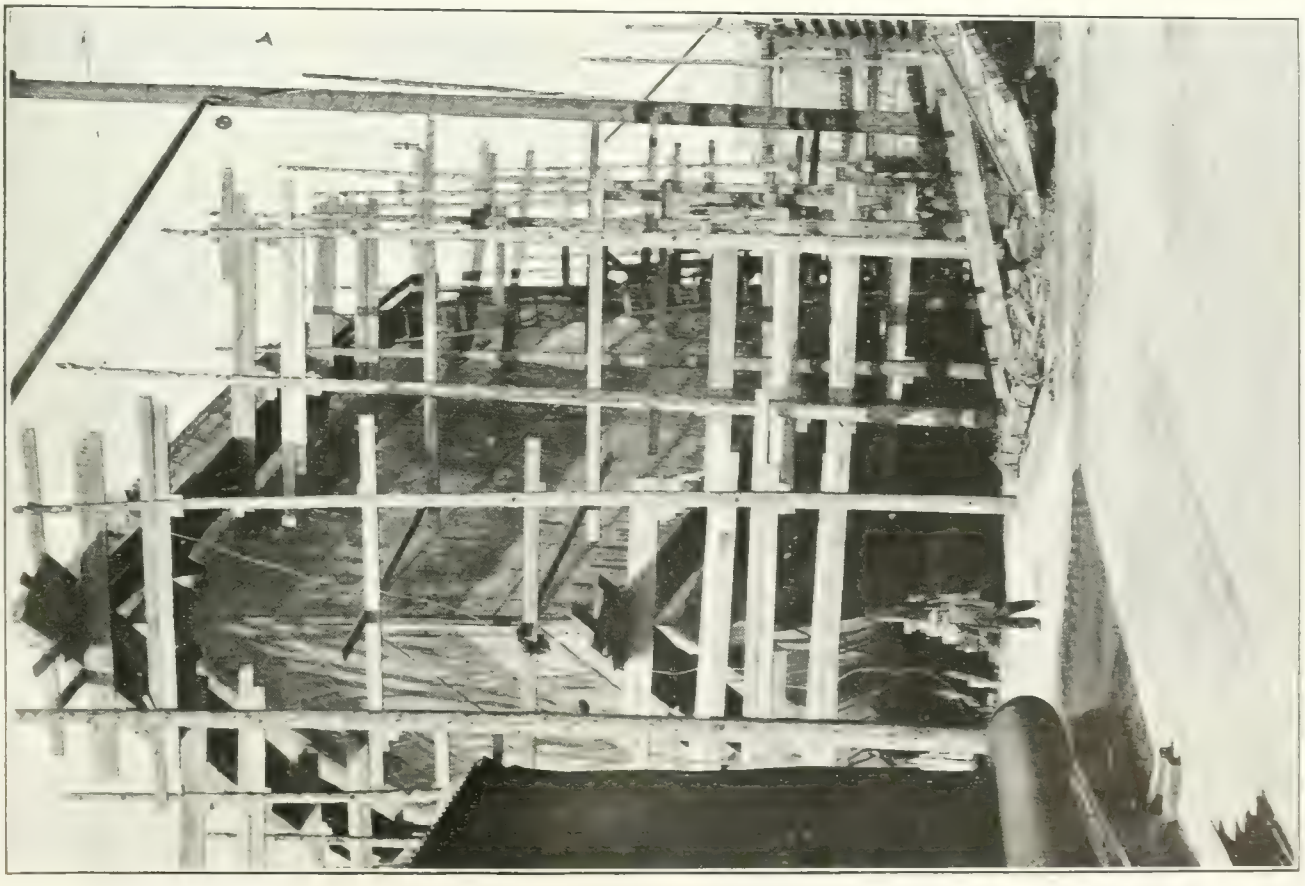
The composite fuel produced must comply with the Admiralty specification for liquid fuel, and must be capable of combining in all proportions with certain specified mineral oils so as to give a suitable Admiralty fuel, and of being used in the Admiralty type of burner under service conditions without depositing carbon or other matter to such an extent as to choke the jets or hinder the proper working of the burners. While standing in an open vessel for at least a month at normal atmospheric temperature the fuel must not throw down any deposit, and after so standing the whole of a quantity of not less than 20 gallons must pass through steel gauze 32-mesh to the linear inch having an area of 1 sq. in. inserted in an open funnel 12 in. deep, without choking the gauze, at all temperatures between 60 and 200 deg. F. The process employed must be such as to utilise at least 95 per cent. of the original dehydrated tar, and it is desired to use the highest possible proportion of tar in the mixture, which will not be regarded as satisfactory if it contains less than 33 per cent. of tar. There will be no objection to the use of a third ingredient in order to form a suitable compound or emulsion, provided the fuel is not caused to fail to comply with the Admiralty specification for fuel oils and its calorific value is not reduced more than 1 per cent. below the mean calorific value of the dehydrated tar and petroleum used in the mixture. Any such third ingredient must be readily obtainable in this country at a reasonable cost, and if it is obtained from coal tar it must not be used in a greater proportion than 5 per cent. of the dehydrated tar with which it is being mixed. The Admiralty and Petroleum Executive must be satisfied that any process suggested is of such a nature as to be capable of ready and economical application at the present time without absorbing an undue amount of labour and materials; that the methods proposed are in every way practicable and will enable large quantities of tar to be used; and that the resultant fuel can be stored, handled, and satisfactorily pumped and burned in the same manner as the fuel now used in the installation of a warship at sea.

East Asiatic Company, Copenhagen.—The proposal to double the share capital having been accepted, new shares to the nominal value of £1,380,000 are being offered to old shareholders at 150 per cent. The present price of old shares is about 690 per cent. At the request of the managers and directors, their bonus shares are being reduced from 5 to 2 per cent., and from 10 to 5 per cent.; during recent years most of their bonus has been allotted voluntarily to the staff pension fund, which now amounts to £331,000. After completing the new issue of shares, the capital, with reserves, will amount to £5,500,000.

SPEEDING-UP BRITISH SHIPBUILDING.

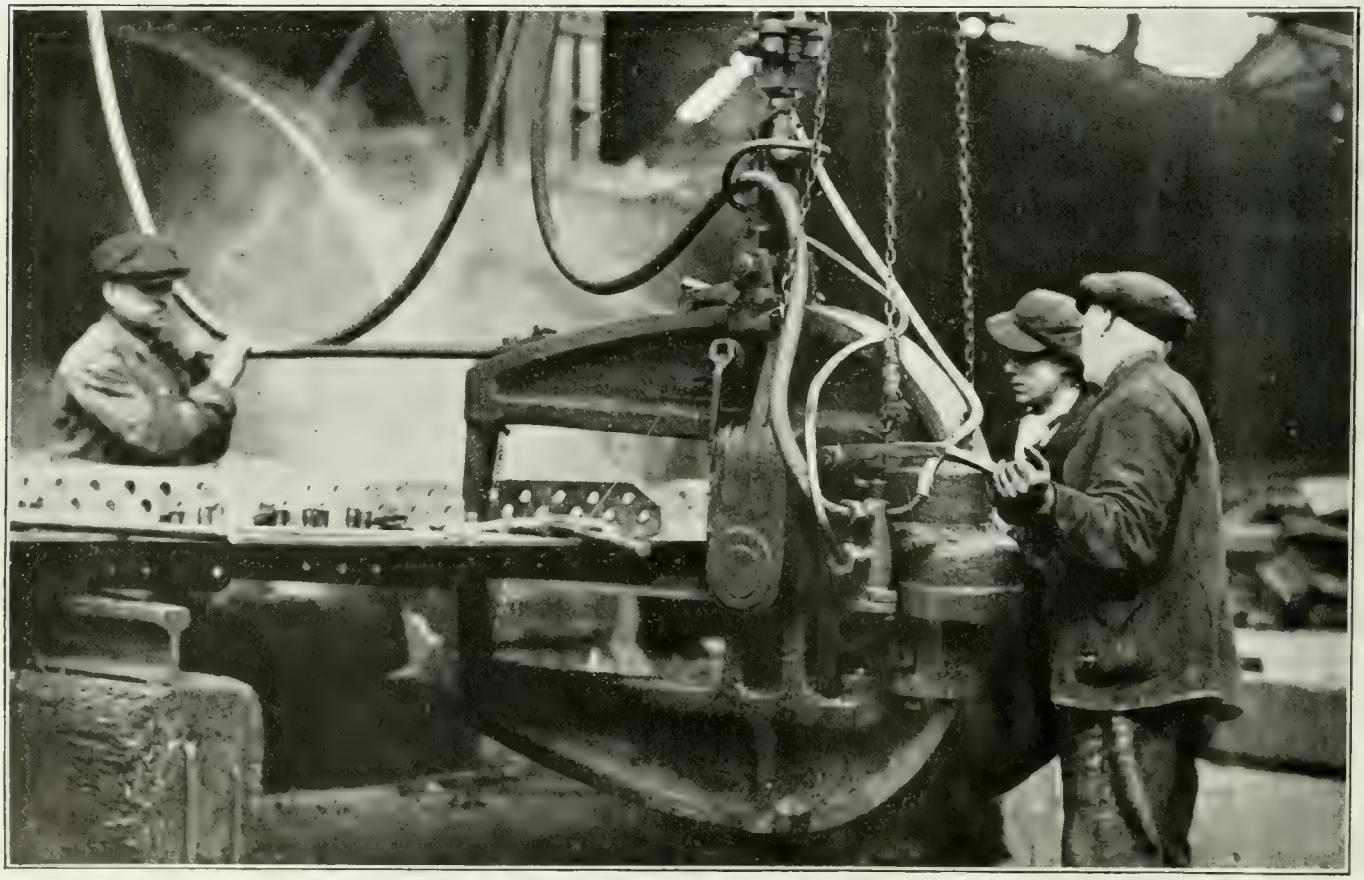


A Ship in Frame on the Clyde.



A Standard Ship Plated and, on the right, an Isherwood Tanker in Frame.

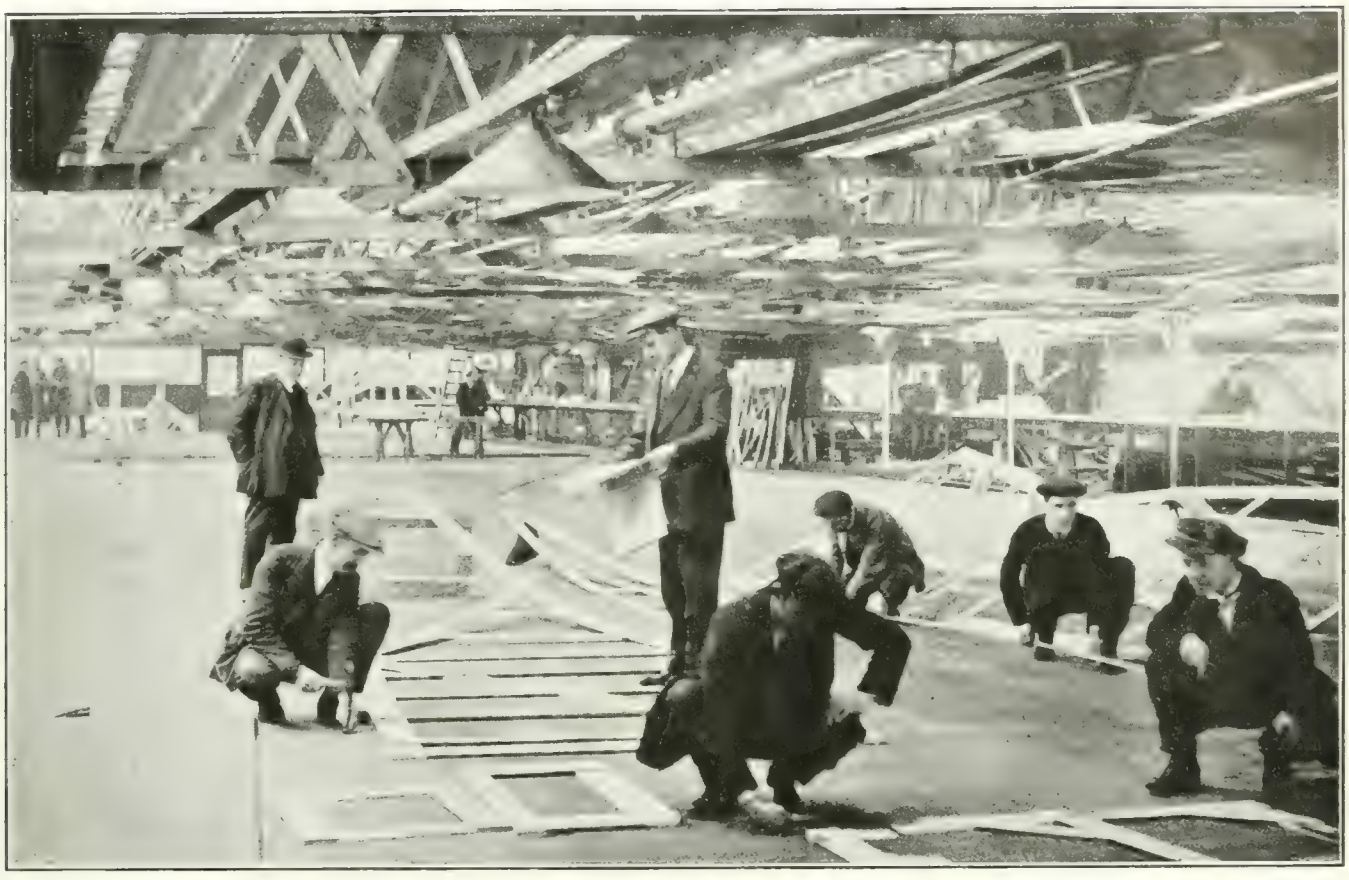
Laying a Keel on the Clyde.



British Official.

A Hydraulic Riveter on the Tyne.

BRITISH SHIPBUILDING.



Moulding Loft of a prominent Tyne Shipyard.

Frame Bending in a Tyne Shipyard.

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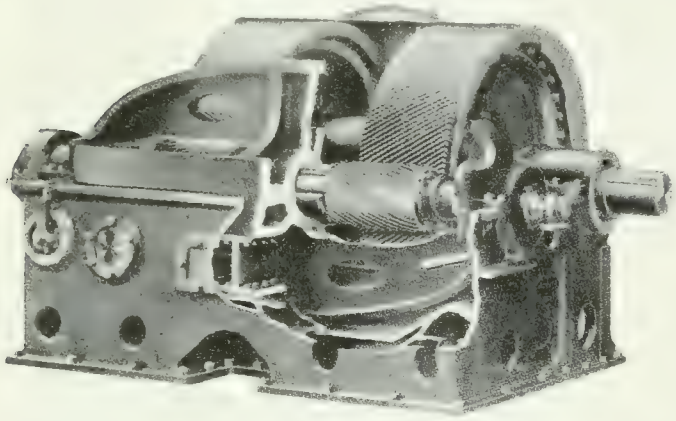
## THE DESIGN AND PROGRESS OF THE FLOATING FRAME GEAR.*

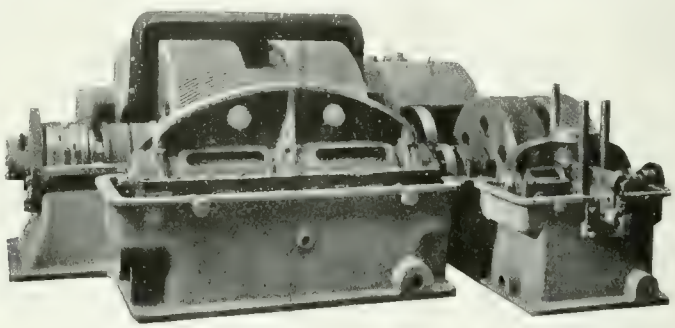
By John H. Macalpine.

In 1889, Dr. Gustaf de Laval, discarding an earlier form of turbine he had used, introduced his geared turbine, which quickly became well known, and has met with considerable success. This single-stage turbine is built up to about 600 h.p., but I believe its principal success has been attained at powers not exceeding one-third of this. The gearing is double helical. In the smallest sizes the pinion actuated a single gear, such as was then in common use. Probably the teeth were formed with more care than had previously been done, and in order to run at 1,440 ft. per min. must have been very accurate. In the larger sizes he placed the pinion between two gear wheels, and thereby, I think, made a serious mistake which probably delayed the recent development of reduction gearing for many years. It was unsuitable for marine application (though Sir Charles A. Parsons applied it to a small launch), for it is altogether forbidden to have two propellers in a ship driven by one turbine and pinion. For safety and manœuvring they must be made independent.

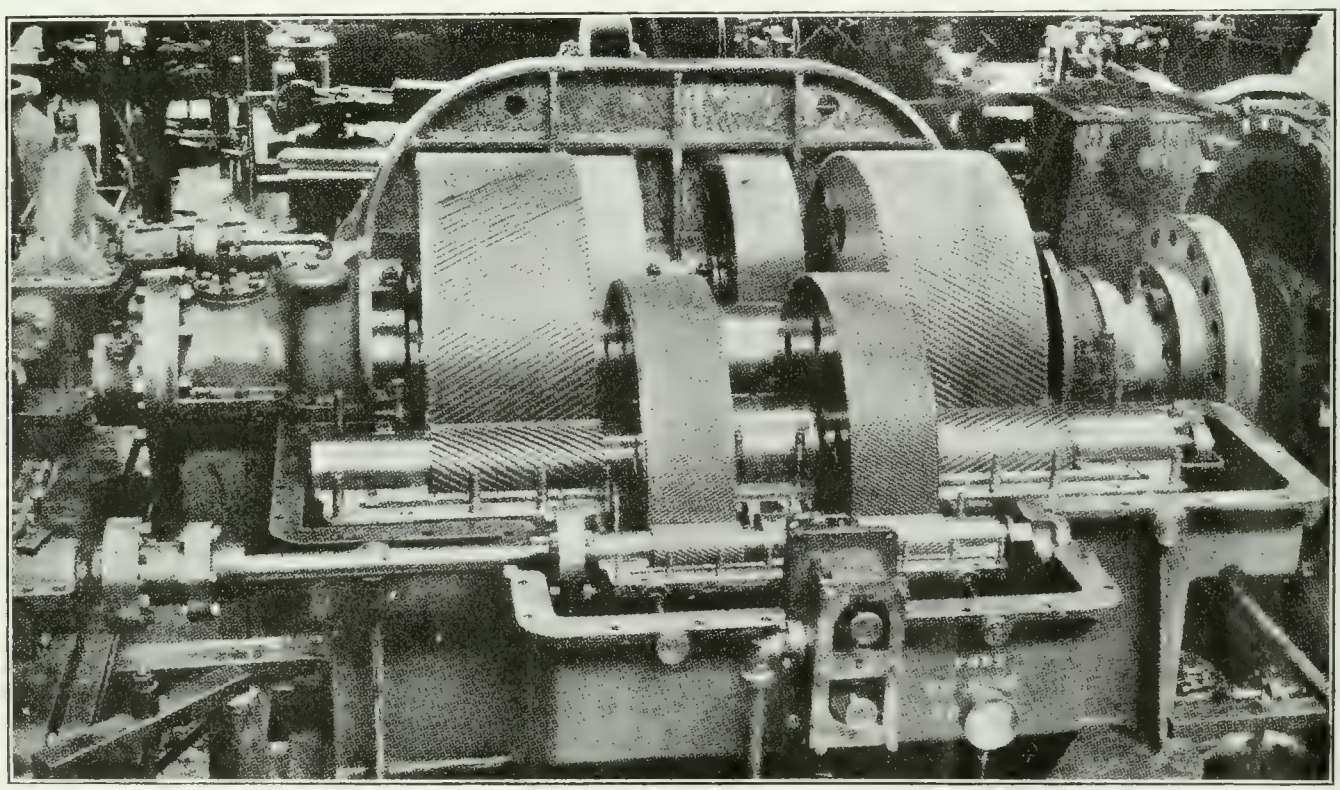


**Experimental Single Reduction Floating Frame Gear, showing Section of Floating Frame.**

For good economy de Laval's single-stage turbine must run very fast, and, therefore, the ratio of gear to pinion diameter must be large in order that the speed of rotation of the large gear may be sufficiently reduced for driving pumps, blowers, and so forth. Thus the pinion is made very small in diameter, so that the gear-wheel diameter may be kept within reasonable limits. To give sufficient tooth contact this small pinion must be made as long as practicable. This introduces two difficulties of great importance —(1) A slender pinion is liable to cross-bending between the bearings, (2) The torsional yield of the pinion becomes important. Both these distortions cause bad distribution of tooth pressure. The torsional error is in no way counteracted in the de Laval gear, and would, alone, limit the average pressure which can be applied



**Double Reduction Floating Frame Gear, with Micheli Thrust Block Gears Housed in Separate Casings.**



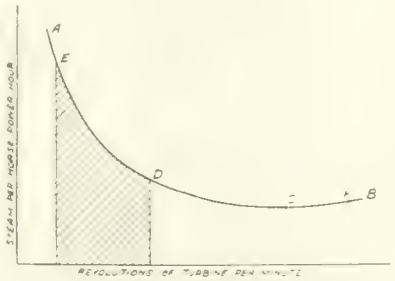
**Double Reduction Floating Frame Gear in Single Housing.**

* Abstract of Paper read before the Institution of Engineers and Shipbuilders in Scotland, March 19, 1918.

per inch of tooth. It is sought to prevent cross-bending by placing the pinion—in all but turbines of small power—between the two gear wheels. It thus pushes up on one side and down on the other. If the powers transmitted by the gear wheels are equal, there is no cross-bending of the pinion, but it is not possible to maintain this equality at all times, and then serious cross-bendings may occur. Thus, this is never a safe way of eliminating the cross-bending error in any gear design.

More important than either of these, in any gear whatever which has all the pinion and gear bearings cast in one solid housing, the slightest warping of this casting, or other causes, will put the pinion out of line and cause highly localised and intensified tooth pressures, especially if the pinion is long. (Where there are two gear wheels, as here, this danger is intensified.) Even if set true at first, misalignment is practically sure to occur during the life of the gear, and the low power constants used are proof of this. These are, I believe, the points in the design which have confined the de Laval gear to small powers.

Up to this time the geared turbine had not been applied to ship propulsion. Gearing had commonly been used in the early days of the screw propeller, but then it was fitted to speed up the slow revolutions of the reciprocating engines of that day to a speed suitable to the propeller.




**Steam Consumption Curve for Direct-Connected and Geared Turbines.**

But a great departure must now be noticed. In 1884 Sir Charles A. Parsons took his first turbine patent. He applied these turbines on land with increasing success, and later fitted them to the steam yacht *Turbinia*. This vessel so far exceeded in speed the fastest then afloat that naval architects all over the world were amazed. Gradually the direct-connected turbine was introduced, and very many ships of fast and even moderate speed have been fitted thus. The turbines of the *Turbinia* were directly connected to the propellers, but it must have been obvious to Sir Charles, as it was later to any who gave the subject a moment's serious thought, that success with the direct-connected turbine was only possible in a very fast ship. Obviously, gearing would overcome this difficulty, and in 1897 the Parsons Marine Steam Turbine Company, Ltd., fitted a geared turbine of 10 h.p. in a twin-screw launch. There was a pinion between two gear wheels, one of which was mounted on each propeller shaft. But in 1901, after, apparently, numerous experiments, Sir Charles concluded that gears, except for very small powers, were wholly impracticable. No advance was made in the first few years of the twentieth century.

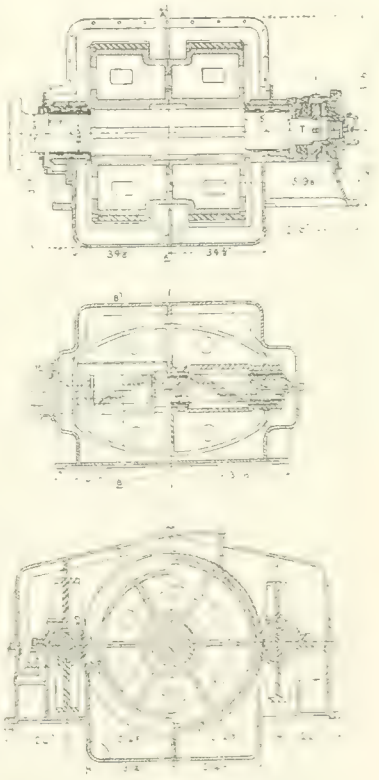
It was at this stage that the problem was taken up by Admiral George W. Melville and myself, resulting in the invention of the floating frame—a stiff frame which carries the pinion bearings and automatically adjusts itself to give a good distribution of tooth pressure. The first idea of the floating frame suggested itself toward the end of 1905, but it did not fully develop for a considerable time thereafter.

The gearing is double helical, the right and left hand helical teeth having a helical angle of 30 deg. The three bearings are carried in a stiff frame and a flexible **I** beam supports this frame. It does not touch the housing, and consequently is free to yield, about a horizontal transverse axis, if there is any change in the resultant tooth pressures. The pinion was also left free to slide longitudinally in its bearings. The pinion is made hollow, and driven through a flexible shaft and coupling in such a way that no constraint is put on the angular position the floating frame assumed, nor on the free endwise play of the pinion.

With rigid bearings, if there is misalignment, the pinion axis sloping up, say, to the left, the centres of pressure will move to the left, and the distribution of the tooth pressure will be very uneven. As the total pressures are not altered, the maximum intensity will be greatly increased. For instance, if the error of alignment is such that the teeth are bearing for only half the length of each helix, the pressure rising from zero at the centre to a maximum at the left end, that maximum will be approximately quadrupled. A little greater error will give nearly point contact and a tremendous increase of intensity which frequently causes abrasion and breakdown of the rigid gear. How exceedingly slight the error of alignment has to be to produce bad contact can be easily shown.

If the pinion is driving two gear wheels, as in the de Laval gear, the case is even worse, as there is still greater redundancy of control, and it is impossible to predict what the effect of errors of alignment will be.

But the case is entirely different when the pinion is mounted in a floating frame. Since the floating frame is free to tip about the centre, the moments of the tooth pressures must be equal. Thus, the first essential condition to ensure uniform loading all along the teeth is fulfilled. The other conditions I will mention here for the sake of clearness.



**Sectional Drawings of Second Reduction Floating Frame Gear, 2,900 s.h.p.**

(2) The teeth must be cut with almost absolute perfection, and the helix angles of the meshing teeth on the gear and pinion must be equal. It would be more correct to say that the sum of the right and left hand helix angles of the gear must equal the sum of the right and left hand helix angles of the pinion. If, say, the helix angles of the gear were each 30 deg., and those of the pinion 29·5 deg. and 30·5 deg. respectively, the floating frame would tip one-half degree and correct the error.

(3) The proportion of the length of helix to diameter of pinion must be such that the cross-bending and torsional errors will not be important.

(4) If there are three bearings carrying the pinion, they must be in line; that is, the floating frame must be very stiff, and the pinion properly bedded.

It has frequently been stated that the floating frame was devised to compensate for bad tooth cutting, and that it was much simpler to cut the teeth properly and omit it. Nothing will compensate for bad tooth cutting, and with properly cut teeth the floating frame assumes its correct position, and keeps it unmoved.

It will be noted that I have not stated as an essential condition that the pinion and gear must be in line. This condition is absolutely essential with a rigid gear; it requires great delicacy and care to bed the shaft so as to attain it, and it is so readily disturbed that it cannot be maintained with any degree of certainty. Hence,

the tooth pressures of a rigid gear are practically sure to be highly localised at some time, and its safe load is thereby greatly lowered. In an experimental floating-frame gear, tested to 6,000 h.p., the pinion and gear never were in line, but I had set it so that the centre lines diverged $\frac{1}{50}$ in. in 5 ft. 9 in.—an enormous error had the gear been rigid. The object had been to design a gear which would run perfectly even if accidentally put out of line, and if it would not do this it was no good. Suppose the gear and pinion axes to be parallel and to lie in the same horizontal plane. If now the pinion axis be deflected in a vertical plane, by flexure of the I beam webs, the tooth pressures would at once bring it back to the horizontal position.

But now let the pinion axis, by warping of the housing, unequal side-wear of the bearings, or other cause, be slightly rotated in the horizontal plane. As the pinion has free end play it will adjust itself by a slight screw motion, so that the teeth of both helices are in action; otherwise the longitudinal components of the tooth pressures would not balance, and the pinion would not be in equilibrium. But the teeth on one helix would bear hard at the outer end, that distant from the I beams, and the teeth of the other helix would bear hard at the inner end, near the I beams. Thus, while the parallelograms of forces would remain equal and the same magnitude as before, the resultants would not be at the same distance from the I beams, equilibrium would be destroyed, and the floating frame would tip slightly to bring back the symmetrical position of the resultant tooth pressures. Hence, neither a vertical nor a horizontal rotation of the floating frame can exist alone.

It is quite obvious that there is only one plane in which a rotation of the pinion axis is possible; that is, it must rotate about an axis parallel to the line of contacts. But if the pinion axis is rotated, the linear movement of the outer ends of the helices will evidently be greater than that of the inner ends. Thus, if such a movement be continued, but guided so as to keep the teeth at the inner ends of the helices in contact, the outer portion of these teeth, since they move in larger curves, will open slightly. It is a simple though somewhat tedious calculation to find how great this opening will be for a given rotation of the pinion axis. I will show the result only. The calculation was made for the experimental gear with an angle of obliquity of tooth action of $14\frac{1}{2}$ deg.

In the design of the experimental gear, provision was made to fit horizontal gauges outside the end bearings of the pinion and gear to measure, even when running, any error of alignment. The gauge holes were 9 ft. $4\frac{1}{2}$ in. apart.

When the sum of gauge errors has reached $\frac{1}{8}$ in.—an error which will never be remotely approached—the opening of contact is $\frac{1}{8500}$ in. As the opening of contact is proportional to the square of the gauge error, at $\frac{1}{10}$ in. gauge error there is $\frac{1}{2500}$ in. opening and at $\frac{1}{50}$ error—still very large—the opening of contact has decreased to $\frac{1}{85000}$ in. All these quantities are far within the limits of the finest machining.

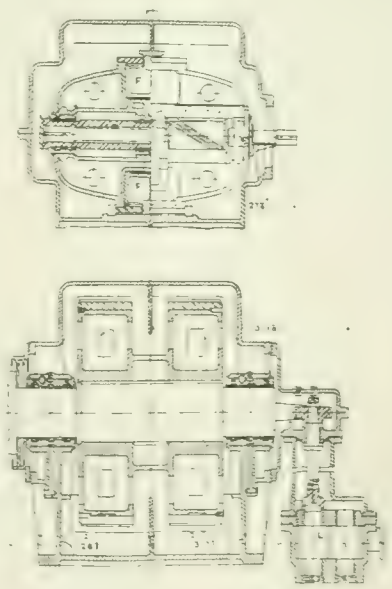
Further, the teeth are elastic, and calculation shows that when loaded to 6,000 h.p. an opening of contact of $\frac{1}{1000}$ in. would readily be closed. Therefore, the closing of these openings will not sensibly disturb the distribution of tooth pressure; that is, a floating-frame gear can run as well when much out of line as when in line, and the bugbear of rigid gears entirely disappears.

Having got rid of this great delicacy, it seemed reasonable to hope that a floating-frame gear could safely be loaded to two or three times the continuous safe load for a corresponding rigid gear. This has been fully confirmed by experience.

Even assuming a much smaller load than the experimental gear was tested to, it was a safe prediction that the present engines of the *Mauretania* could have been replaced by geared turbines in half the space and with half the weight, and giving higher efficiency. Thus, a smaller, cheaper, and more economical ship could be built to give the same duty.

The direct-connected marine turbine becomes very uneconomical at reduced speed. The consumption curve plotted on revolutions per minute is somewhat like AB (see page 549). The direct-connected turbine, being underspeeded to suit the propeller, has the full speed consumption of steam per horse-power hour D, and as the speed is reduced this quickly rises to such a point as E. The reciprocating engine usually becomes more economical as the speed is reduced; hence, if coal is short, much can be saved and port reached more easily by reduction of speed of the ship. But with the direct-connected turbine this important advantage is largely lost. With the geared marine turbine it was hoped that the full power would be made at F, beyond the most economical speed, and the ordinary running speed at C the point of greatest economy. It was also hoped that the curve would become so flat that a great reduction of speed could be made without greatly increasing the water rate.

On page 548 is a perspective drawing of the experimental gear with the housing and floating frame partly broken away. The pitch-line diameters of the pinion and gear are 14 in. and 70 in. respectively. The experiment was on a large scale to make it impressive.



**Sectional Drawings of First Reduction Floating Frame Gear, 1,450 s.h.p., showing Dynamometer Cylinders F.**

I am pleased to say that all the theoretical predictions made were exactly fulfilled. In fact, experience has shown that the action of the floating frame allows the pinion to be loaded to a much higher horse-power than was ever expected.

The gear was driven on the test floor by a 6,000 h.p. turbine, actuating the pinion up to 1,500 r.p.m. The largest gear transmitted the power to a very large water-brake by which it was absorbed and measured, and the principal test was of 40 hours' duration. The conditions all through were kept almost uniform, the average being 300·6 r.p.m. of the large gear and 6,048 h.p. The frictional and other losses were very slight, showing from 98·5 to 99·0 per cent. efficiency. On opening the doors in the cover immediately afterward, everything was found in perfect condition, and from the appearance of the teeth it was evident that the gear was far below its safe load. It is now known that the gear could have been loaded at least three times as much with safety.

The first drawing of the floating frame is dated September 26, 1906, and I am quite confident that this will come to be generally recognised as the first fixed date in the almost unparalleled expansion in the adoption of the geared turbine as now seen. But the first great impulse to this expansion was given when, rising from the small powers of the de Laval turbine, 6,000 h.p. at a pitch-line speed of 5,500 ft. per minute was easily run off by the experimental gear.

I would like to add a few results, theoretical and practical, in addition to the foregoing discussion of errors of alignment, the annulling of which was the object and is the most valuable function of the floating frame.

The cross-bending of the pinion becomes important if the pinion has only two bearings. Consequently, a three-bearing pinion will carry a much heavier load than a two-bearing pinion of the same diameter. There is no practical difficulty in securing alignment

of the three bearings. The torsion of the pinion slightly increases the helical angle of one helix and decreases that of the other. This causes the floating frame to tip slightly, and it can be shown that this corrects from one-half to two-thirds of the error. The best proportion is to have the length of each helix about twice the diameter.

In floating-frame gears 30 deg. helical angle has always been used. This brings sufficient teeth into contact at one time to secure smooth and quiet running, and gives ample longitudinal forces to determine the position of the pinion. In rigid gears this angle is frequently made 45 deg., no doubt to make these gears more quiet. But this sacrifices much strength of tooth.

Experience has not yet definitely shown what is the best number of teeth for the pinion. I would hesitate to adopt less than 25, and possibly 30 would be better. I think the upper limit may be quite safely put at not more than 35.

Perhaps the most important constant in connection with gearing is what I have called the "power constant." It is—

$$\text{Power constant} = C\,\frac{1{,}000P}{D^3R}$$

where P = horse-power transmitted,
R = revolutions per minute of pinion,
D = diameter of pinion in inches.

The factor 1,000 is introduced to bring C to a value usually between unity and 10.

In a small proportion of cases, especially where there are two pinions driving one gear, the turbine diameters require the pinion centres to be farther apart than they would otherwise be made. The pinions then must be of larger diameter and the helix length can be considerably shortened. If, for instance, each helix length is less than 1·5 diameter a considerable reduction of the power constant, from that used for two diameters, will naturally be made.

While the exact determination of the elasticity of the pinion is a most complex problem, good approximations can be made. Consideration of the great stiffness of the teeth alone shows that misalignment of even $\frac{1}{1000}$ in. measured outside the helices, even in a large gear, is far from an unimportant quantity.

It is important to state that no indication of a limit to pitch-line speed has yet been found. Floating-frame gears have been run up to 9,600 ft. per minute, and there was no reason to conclude that they could not have been run much faster without reduction of tooth pressure. Therefore, for a given gear, D = constant, the power constant gives P proportional to R. Of course, the oil must be injected freely on the teeth as they are running into contact, so that it may not be thrown off by the great centrifugal forces.

The three highest power-constants for rigid gears which I have found were for marine gears. The *Vespasian*, the first geared ship engined by the Turbinia Works Co., tried in 1910, gave a power constant of 3. The sister ships *Ciudad de Buenos Aires* and *Ciudad de Monte Video* gave 2·58 for the pinion of the high-pressure turbine and 1·29 for that of the low pressure. These were all the highest measured-mile trial results of a few minutes' duration. From published results it appears that the *Vespasian's* gears operate usually with a power constant of about 1·85, and no doubt the sister ships referred to also have much lowered power-constants when in service.

Power constants of 3·5 and 4 are perfectly safe for floating-frame gears. Indeed, in the 12-hour full-power trial of the U.S. collier *Neptune* the average power-constant was 5·22. She has been in service for over two years, and is frequently used at full power. Between April 1, 1916, and March 31, 1917, she steamed about 40,000 nautical miles, the speed for most of this distance being between 12 and 13 knots, giving a power constant from 3·5 to 4·3.

The fact that such high power-constants can be used is convincing proof that practice agrees with the foregoing theory of the action of the floating frame. Further confirmation should be evidenced by the wear on the teeth, which should be extremely small if pressure distribution is good. This is abundantly proved by the first gear put in operation. It was installed by the Commonwealth Steel Co., Granite City, Ill., and started on March 31, 1911. When examined on April 30, 1916, after over five years' service, the scraper marks, originally of imperceptible depth, were still visible on the gear teeth, and the driving face of the pinion teeth had taken on a very high polish. The gear was as quiet as at first. When installed it ran five and, latterly, six days and nights per week. It may be objected that this early gear had not a very high power-constant, but at maximum load this was 1·68. Not many rigid gears exceed this value in regular service.

Increase of the safe power-constant obviously means increase of the safe load which can be put on a given size of gear; and, unless the change of design by which this increase is effected involves a proportional increase of weight, the weight per horse-power is decreased. Since weight and compactness (especially in marine applications) and safety in all cases are the principal considerations, it follows that the higher the power constant a gear will safely bear the better. So that gears, whether of the same or different types, should be compared principally by the safe value of the power constant, due allowance being made for any change of weight or bulk inherent in the design. In comparing rigid and floating-frame gears the rise of the safe power-constant offsets many times the increased weight and bulk; indeed, for a large ratio of reduction these increments are insignificant. In one marine installation the weight guaranteed by the Westinghouse Machine Co. was 26,000 lb.; while two competing rigid gear builders offered 40,000 and 50,000 lb. respectively. The floating-frame gear was accepted, and built at 1,000 lb. less than the guarantee.

High-class alloy steel is *not* used either for the pinion or gear rims. These are always made of a good quality of mild carbon steel. This commercial steel is more readily procurable and much more reliable, and does not fail, though carrying over twice the load of gears of the same dimensions, which have no provision for securing good distribution of tooth-pressure, and in which, consequently, imperfect contact is sure, sooner or later, to occur.

The adoption of high-class alloys is an admission of great trouble from errors of alignment of the gear and pinion. It does not remove the cause of failures—that is, error of alignment. It materially increases first cost, and the harder material will intensify the localisation of pressure, and great danger of abrasion will remain.

The first merchant ship fitted with floating frame reduction gears by the Westinghouse Machine Co. was the *Malmanger*, an oil-tank steamer of 12,650 tons displacement, 2,900 s.h.p., 10·5 knots speed, fitted with cross-compound turbines, two first and one second reduction gear. The turbines are aft of the gear, as this allows the propeller shaft to be drawn inboard without disturbing the gear. For full speed ahead the turbines run at 3,860 and the propellers at 75 r.p.m. The first-reduction gears of the *Malmanger* are shown partly in section on page 550. The upper view shows the floating frame. The cylinders F constitute a dynamometer for measuring the power transmitted. When the power is not being measured the floating frame is bolted to the housing. When it is desired to measure the ahead power, these bolts are very slightly turned back, so that by pumping oil into the lower cylinder F, the floating frame is oil borne. Obviously, from the oil pressure, diameter of oil cylinder and speed of pinion, the power can be calculated. The upper cylinder is similarly used to measure the astern power. The lower view shows a section of the large gear and also the rotary oil-pump L, driven by screw gearing from the gear shaft. The flow of oil to all high-speed bearings and to the teeth must be copious. It is projected on the teeth just as they are coming into mesh, so that centrifugal force cannot prevent thorough lubrication.

The second-reduction gear is shown on page 549. The upper

view shows the Kingsbury thrust bearing, known in Britain as the Michell. Below is shown a transverse section of the second-reduction gear. Each first-reduction gear drives one of the pinions. The photograph on page 548 shows the first and second-reduction gears partly open.

The *Malmanger's* gear was designed in 1915, the then standard 3,400 h.p. gear with a power constant of 3·3 being used. At 2,900 h.p. the power constant is only 2·81, but the ship is over-boilered for this power, which may, therefore, be much exceeded at times. No special effort is made in the arrangement of this gear to save space or weight. The double-reduction gears in one housing are more compact.

The twin-screw passenger and freight ship *Mauri*, of 17,500 tons displacement and 17·5 knots speed, which ran between San Francisco and Honolulu, was built at the Union Iron Works, San Francisco, for the Matson Navigation Co. Her turbines are cross-compound and reversible. To conform to the limitations of the engine room, the H.P. turbine actuates a pinion almost on top of the gear. The L.P. pinion is level with the gear shaft. The maximum guaranteed continuous horse-power is 12,500, with 2,120 r.p.m. of the turbine, and 133 of the propellers; but usually less power (8,500 h.p. at 120 r.p.m. of the propellers) was intended to be used. She has proved remarkably economical. A single-screw sister ship, the *Matsonia*, is fitted with reciprocating engines. The owners, by careful observation of five round trips of each, find that the geared turbine-driven *Mauri* is 22·87 per cent. more economical. This is in spite of the fact that the oil burners of the boilers of the *Mauri* are defective; and the propeller pitch is too coarse, holding down the propeller revolutions to 106 per minute, instead of 120, which would ordinarily have been used.

On page 548 is shown a marine gear, double-reduction, with two first-reduction gears complete, and two second-reduction double-helical pinions driving one double-helical large gear on the propeller shaft. The upper halves of the two floating-frames on the near side of the second-reduction large gear are removed; but the upper half of the second-reduction floating frame in the far side is in place. Each floating frame has three bearings. It will be seen that the second-reduction floating frame carries the large gear of the first reduction and the pinion of the second reduction. The whole gear is in one housing, and forms a compact and light design, weighing, without the Kingsbury thrust block, 34 tons. The gear is of 3,400 h.p. at 3,740 r.p.m. of the small pinions. The power constant for each reduction is 3·28, so that the saving in weight is not pushed to a high degree. The first reduction is to 450 r.p.m. and the second to 72 of the propeller shaft, or a total ratio of reduction of nearly 52 to 1.

The weight and bulk of reduction gear of a given power depend very largely on five or, in a double reduction, six things—(1) The revolutions per minute of the first pinion. (2) The ratio of reduction. (3) The factors of safety used. (4) The general arrangement. (5) The power constants. (6) In a double reduction, the division of the steps in the reduction. Increase of the large gear, necessitating an increased size of housing and cover, so quickly increases the weight that, in making any comparison, (1), (2), (5)—and (6), in a double reduction—must always be specified before the comparison can have any meaning. Again, retaining the same general arrangement as the gears just shown, if the centre journals of the pinions were omitted, and, say, the helix lengths decreased, the weight and bulk of the gear would both be much reduced; but cross-bending of the pinions—especially, in this case, of the spindle carrying the second-reduction pinions and first-reduction large gears—would be greatly increased, and also tooth-pressure, so that the factors of safety would be seriously lowered.

As is usual with most things new, the merits of the floating frame came only gradually to be understood, and progress at first was slow. This accelerated later, so that for some years orders have been placed more rapidly than the facilities for turning them out could be expanded. Even before the recent large orders were placed by the U.S. Government, the gears undelivered totalled about 1,000,000 h.p. Nearly all the early gears were for land installations, though the primary problem in view was the improvement of marine propulsion. Gradually the orders for marine applications grew, and latterly far exceeded those for land.

On February 1, 1918, the following ships fitted with floating frame gears were under construction—viz., 52 U.S. Navy vessels, 4 foreign navy vessels, and 271 merchantmen, making a total of 327.

The largest naval vessels being engined are three U.S. scout cruisers of 90,000 s.h.p. each, on four shafts, and one foreign battleship of 88,000 h.p. Three of the naval vessels have only cruising gears. With the exception of the *Mauri*, and the three latest vessels for which machinery has been ordered, all the merchant vessels are single screw and double reduction, having two or, in a few cases, three gears each.

## A BRITISH-BUILT TURBO-ELECTRIC VESSEL.

Reference was made in our issue of January 31 to the completion of the first Ljungstrom marine turbine installation constructed in the United Kingdom. The first British vessel to be equipped with this means of propulsion is the *Wulsty Castle*. Her basin trials were carried out last week. The *Wulsty Castle*, which is owned by the Lancashire Shipping Company, Ltd., and is of 6,000 tons d.w., is the first British-built vessel to be equipped with this turbo-electric system of propulsion.

In our issue of December 6 last, there appeared a comprehensive illustrated account of the Ljungstrom turbo-electric system, in which were given some statistics relating to comparative tests between two Scandinavian vessels of about 1,700 tons, one of which was equipped with triple-expansion reciprocating engines, while the other was engined on the Ljungstrom principle. These tests resulted in the latter consuming 42·3 per cent. less coal than the vessel fitted with reciprocating engines. On that basis the saving in a 6,000-ton vessel should be a very material factor. But, under existing conditions, ordinary commercial considerations are of less importance than the question of tonnage, and apart from the necessity of speeding up new construction to the utmost limit, is that of securing the maximum cargo space on individual vessels. It is claimed that the *Wulsty Castle* possesses from 8 to 10 per cent. more cargo space than a ship of approximately equal dimensions equipped with reciprocating engines, an advantage which needs no comment. It is, of course, obvious in this connection that decreased coal consumption brings in its train the necessity for smaller bunker space.

The engine-room of the *Wulsty Castle*, which resembles an electric railway power-house rather than the machine-room of an ocean-going vessel, strikes as unusually compact, and one is also favourably impressed with the simplicity of the switchboard control. A special feature of the vessel is the extremely low propeller speed obtainable, which, with the extreme sensitiveness and flexibility of the electric steering gear, is an extremely desirable factor in these days of convoys.

Owing to the special conditions now prevailing, the *Wulsty Castle* has been unable to proceed to sea for trial, all the trials having been carried out in the dock. Her trials proper will therefore take place on the maiden voyage, the results of which will be awaited with interest by all marine engineers and shipowners.

Concrete Barge Building.—Workmen are now engaged preparing the berths for the building of concrete barges at R. Blackett & Sons' new yard at Thornaby-on-Tees. Present plans are to build barges of ferro-concrete from 150 ft. to 200 ft. in length and up to 1,000 tons. There is a good deal of land available for the enterprise, and as a start three berths are to be laid out.

# GENERAL NEWS SECTION.

## PERSONAL.

Sir Wm. Seager, Cardiff, has given one thousand guineas to endow a bed at the Prince of Wales' Hospital, Cardiff.

The death occurred on May 10, at Belfast, of Mr. John Tregaskis. He was 77 years of age and had been the harbour master at Bangor, co. Down, for 30 years.

Lieut.-Commander C. K. Sergent, of the North-East Coast Trawler Service, who has received recognition for meritorious rescue work in the North Sea, is a Deputy Master of the Newcastle Trinity House.

Sir James Knott, Sir Walter Runciman, Bart., M.P., Sir C. A. Parsons, and Mr. W. J. Noble have each given £1,000 to the Lord Mayor of Newcastle's "Lest We Forget Week" on behalf of the local War Relief Fund.

Lieut. G. Signey Bird, Motor Transport Service, who has been awarded the Military Cross, is a B.Sc. of Durham University, and previous to the war was in the drawing office of the Tyne Iron Shipbuilding Company, Wellington Quay.

Mr. William Holford Dixon and Mr. Frederick William Lund have been elected underwriting members of Lloyd's. They are both partners in the firm of Harris & Dixon, Ltd., steamship owners and brokers, 81, Gracechurch Street, London, E.C. 3.

Mr. Oliver Montague Evans, Mumbles, part proprietor of the Birchgrove Colliery and partner in the shipping firm of Phillips, Evans & Co., of Swansea and Cardiff, who died intestate on October 6 last, left estate of the gross value of £3,518, of which £3,147 is net personalty.

Mr. T. S. Elliott, honorary secretary of the Tyne Shipbuilding, Engineering and Steel Commercial Staffs' Association, at a meeting in Newcastle last week, was presented with a cheque for the purchase of a roll-top desk in recognition of his valuable services in connection with the successful formation of the Association. The presentation was made by Mr. J. Mathieson, the president.

Silver medals and diplomas have been awarded by the King of Norway (through the Marine Department of the Board of Trade) to W. Ward, boatswain, and J. Reid, quartermaster, of the steamship *Albanian* (Leyland Line, Liverpool), in recognition of their services in helping to rescue the shipwrecked crew of the Norwegian full-rigged ship *Ilala*, 1,375 tons gross, of Christiania, on March 5, 1917.

Mr. A. Munro Sutherland, Chairman of the Sutherland Steamship Company, Ltd., presided over a very large gathering on Newcastle Commercial Exchange, on St. George's Day, when the drums and colours of a battalion of Northumberland Fusiliers, which the Quayside raised and has been specially interested in until its recent disbandment, were formally presented to the Exchange.

The following have been elected new members of the Bristol Channel Institute of Shipbrokers (Incorporated):—Charles L. Clay and Sidney P. Richard (C. L. Clay & Co., Ltd.); Herbert Coward (P. H. Coward & Sons); George Banks (Hopkins, Jones & Co., Ltd.); R. M. Hunter (Kestell Bros.); Frank Mules (D. Mules & Sons); Andrew Young (Orders and Handford); Gerald H. O'Sullivan (J. O'Sullivan & Sons, Port Talbot); Thos. Powell (Powell & Martinez, Ltd.); A. Callinicos (Stathatos & Co.); Percy Berrill (Alfred J. Smith, Ltd., Bristol); R. G. Wilkinson (Wilkinson Bros., Newport).

Mr. E. W. Delacour, publicity manager of the Anglo-Mexican Petroleum Co., Ltd., has been elected President of the Society of Motor Advertising Managers for the ensuing year, in succession to Mr. E. E. Reinhold, of the Vacuum Oil Co. Mr Hubert O. Davies, of John I. Thornycroft & Co., Ltd., has signified his willingness to continue the duties of hon. secretary and treasurer of the Society.

Deep sympathy was felt on Tyneside with the Hon Sir. Charles A. Parsons and Lady Parsons when the news came that their only son, Major A. G. Parsons, R.F.A., had been killed in action on April 26. Major Parsons was born in 1886, and after leaving Eton he entered the Royal Artillery through Woolwich, but after a few years he left the service to enter upon an apprenticeship with the Wallsend Slipway and Engineering Company, Ltd., whose works closely adjoin those established by his father at Wallsend, and from which in 1894 the "little mystery ship," the *Turbinia*, proceeded upon her experimental trials and afterwards astonished the world by attaining a speed of 34·5 knots, or nearly 40 miles an hour. Major Parsons subsequently became a director of the Heaton Works of C. A. Parsons & Co., Ltd. When the war broke out the old military spirit became uppermost with him, and he rejoined the Artillery, and later proceeded to France. For a time he was transferred to the Royal Flying Corps, but afterwards returned to his battery, and was wounded in November last year. Major Parsons only returned to the front in March this year in charge of a battery.

## NEW SAILING FREIGHT RATES TO FRANCE.

The new limitation of Freights (French Ports) Order, which came into operation as from May 1, in amendment of the Order of February 5 last, has now been issued. The main change affects the rate of freight for sailing vessels fully rigged or dismantled, and also barge rates, inclusive of cost of war risk insurance on ship.

The following table compares the rates fixed in the Order of February 5 last with those scheduled in the new Order:—

| Port. | Scheduled rates of February 5. | The new scheduled rates. |
|---|---|---|
| Rouen | 68/6 | 76/- |
| Havre | 64/- | 71/6 |
| Dieppe | 66/3 | 73/9 |
| Dunkirk | 75/- | 82/9 |
| Calais | 72/- | 80/6 |
| Boulogne | 71 | 78/6 |
| Treport, Cherbourg, Fecamp | 66/3 | 73/9 |
| Caen, Granville, Honfleur, Trouville | 65/3 | 72/9 |
| St. Brieux | 67/6 | 75/- |
| St. Malo, St. Servan | 60/6 | 68/- |
| Brest | 62/9 | 68/- |
| Gravelines | 75/3 | 82/9 |
| Duclair, Caudebec | 72/- | 79/6 |
| St. Valery-sur-Somme, St. Valery-en-Caux, Courcelles, Port en Bassin, Isigny, Carentan | 106/3 | 85/- |
| Morlaix | 106/3 | 80/- |
| Treguier, Paimpol, Roscoff, Abervrach, Pontrieux, Lezardrieux | No specific rates scheduled | — |

The new rates, with one or two exceptions, are higher than those in the original Order. Morlaix is excluded from the list of ports for which a uniform rate of 106s. 3d. was fixed, and included in a new list of ports for which the rate is 80s.

The otner changes are as follows:—

(*a*) The conditions provide that for the shipment of scrap iron, steel and tinplates, rails and fishplates, the rate per ton shall be 8s. 6d. in addition to the rates of freight fixed in the schedules, and 4s. per ton in the case of clay.

(*b*) In the first schedule giving the maximum rate of freight for steamers not exceeding 400 tons, inclusive of cost of war risk insurance, Chantenay and Nantes are given a separate rate of 41s. 6d., also a separate rate of 32s. 6d. for steamers exceeding 400 tons, but not exceeding 500 tons gross register, exclusive of war risk insurance;

a separate rate of 29s. for steamers exceeding 500 tons, but not exceeding 750 tons gross register; and of 25s. for steamers exceeding 750 tons.

(*c*) The rate of freight for Quimper, which was fixed at 85s., is excluded from the schedule referring to steamers between 500 tons and 750 tons, and as occasion arises in future should be submitted to the Ministry of Shipping for approval.

(*d*) The rates for steamers exceeding 750 tons are increased by 3d. per ton in the case of shipments from Llanelly, Neath Abbey, and Burry Port.

Regarding the chartering of steamers under 400 tons gross, the following is a copy of a letter received from Count M. de Lubessac:—

"With reference to a new limitation issued on May 1, I would be grateful if you advise the Local Committees that the steamers under 400 tons gross will be chartered on the new schedule rates, and a return of premium asked by the Clubs to cover the increase of risk between British coasting trade and the French coal trade will be reimbursed by the French Government. In case of such steamers not insured under a time policy, the War Risk Office will issue a policy for the French coal trade at 4¼ per cent."

## FROM OUR CORRESPONDENTS.

### CLYDE DISTRICT.

(From Our Own Correspondent.)

**Closing of the Gareloch.**—The announcement by the Admiralty that all navigation on the Gareloch to the northward of the narrows at Row Point is prohibited will not affect the coasting shipping traffic to any great extent. The North British Railway Company, which in the past has maintained regular passenger steamer service on the loch, announce that the Admiralty have granted the company permission to run a passenger steamer daily from Gareloch head, calling at the various piers on the route to Helensburgh. The ordinary service to and from Rosneath, Row, Helensburgh and Craigendoran will be continued as usual.

**Dumbarton Shipyard Extension.**—In carrying out schemes for the extension of their yards, shipbuilders have not infrequently to buy out private or other interests in order to secure the necessary ground. Where these interests are purely private or commercial not much difficulty is as a rule experienced provided the purchaser is willing to pay a good price. The case is different, however, where Church property is concerned. At Greenock the proposal of Caird & Co. to acquire the site of a church and churchyard for the extension of their yard has met with a good deal of opposition, while on the upper reaches of the river a firm whose scheme of extension was said to have been hampered by the proximity of a church were faced with similar difficulties. Negotiations in connection with a third case have been begun at Dumbarton, where it is reported that A. McMillan & Son have approached the authorities with a view to acquiring the parish church and churchyard and also a small street adjoining. McMillan & Son, with whom Lamport & Holt are closely associated, have asked the Heritors of the parish whether they would be willing to dispose of the site of the church and churchyard and with the purchase price to build a new church on any site they may select. The firm have also approached the Town Council of Dumbarton with a view to acquiring a small street or lane adjoining the church. Meantime the matter is being considered by the respective authorities. Some time ago McMillan & Son, by means of a provisional order, acquired a portion of the churchyard.

**Danger of Harbour Fires.**—In view of the frequency with which serious outbreaks of fire have occurred at Glasgow harbour within recent years the Clyde Trustees propose to take special measures to prevent further loss from this cause. A fire occurred recently at Yorkhill, through, it is believed, a quantity of oil being allowed to pass into the river and becoming accidentally ignited. The result was that a considerable portion of the wooden piling of a wharf was destroyed, the loss being estimated at about £8,000. It has been suggested that the fire might have been caused by the throwing of hot or burning rubbish into the river from a vessel in the vicinity. It is therefore proposed that the matter be brought to the notice of the Board of Trade, with the object of steps being taken to issue a regulation under the Defence of the Realm Acts in order to secure the safety of the harbour from damage by fire on the water.

In this connection it is interesting to note that proposals are being considered for the establishment of an oil-tank installation wharf at a point sufficiently far removed from the busier parts of the harbour to reduce to a minimum all risk of danger to shipping such as occurred at Yorkhill wharf. The question of establishing an oil fuel depot on the Clyde has been considered on more than one occasion by the Trustees. Hitherto the principal difficulty has been the selection of a suitable site. It is believed, however, that the problem is now likely to be solved in the near future.

**Allowance to Shipwrights.**—A question of considerable interest relating to the 12½ per cent. bonus was decided at a Munitions Tribunal in Glasgow last week. The case was raised by the Shipwrights' Society against a firm of Clyde shipbuilders. It appeared that the shipwrights objected to the payment by results system of remuneration, and that their employers evolved a scheme for extra pay which the men accepted. In giving judgment, the President of the Tribunal said that while saving the anti-piecework susceptibilities of the shipwrights, and enabling them to conform to their trade society's policy of adhering to the system of payment by time, the scheme in principle was a form of premium bonus remuneration. This scheme had been in vogue for two years when the 12½ per cent. bonus to time workers was granted by the Ministry of Munitions in October, 1917. The men, however, continued under their "allowance" scheme till February, 1918, when their union seemed first to have learned of it. The men then demanded the 12½ per cent. bonus, which, after February, they got, and the locally arranged "allowance" scheme was dropped. The question at issue was whether the men were, between October and February, entitled to retain both the privately arranged allowance and also to get the 12½ per cent. bonus. The Tribunal decided that they were not, because the evidence showed that the privately arranged allowance was more favourable by about half-a-crown a week than the 12½ per cent. bonus would have been, and the Order expressly excepted from participation in the 12½ per cent. bonus men who were in receipt of a "more favourable" allowance.

### NORTH-EAST COAST DISTRICT.

(From Our Own Correspondent.)

**The late Sir W. H. Stephenson.**—The widespread esteem in which Sir William H. Stephenson was held on Tyneside was demonstrated at his funeral in Newcastle on Friday, when the attendance of mourners was one of the largest ever seen in the city. Sir William was beloved by everybody. His long life was a noble inspiration in commercial honesty and public usefulness. He had close associations with the leading industries of the district—shipping, coal and iron and steel—and his reputation for upright dealing and honesty of purpose was well recognised by two generations. For 40 years he was a member of the Tyne Improvement Commission, and for 18 years he was chairman of the authority, and the latter day development of the trade and commerce of the Tyne may be attributed in no small degree to his capacity to take a long view of all big commercial questions and to his unselfish devotion to public duty. He was "on deck" to the very last.

**Tyne and Blyth Benevolent Society.**—A very useful organisation in connection with the Newcastle Commercial Exchange is the Tyne and Blyth Benevolent Society, which is generously supported by Quaysiders for the benefit of those who may fall upon evil days through no fault of their own. At the annual meeting Mr. M. M. Mein, shipowner, presided, and made an appeal for increased support in view of the fact that the payments disbursed in relief last year exceeded the sum received in subscriptions. The deficiency had been made up out of interest from investments, but he urged every member of the Exchange to subscribe. It was pleasing to hear from the secretary, Mr. Herbert Shaw, that there had been a good response to an appeal lately made. The new subscriptions amounted to £73, and the total for the year had advanced to £330, but they aimed at making the annual income from regular subscriptions £400, so that they might give further assistance to the beneficiaries.

**The Export of Coal.**—In an address before the Newcastle Rotary Club, on Friday, on our coal supplies, Dr. Dunn, the City Analyst, said it was an arguable point, at least, whether we should not prohibit the export of coal, seeing that our coal supplies were so small a proportion of the world's resources in this respect. There was some little discussion on the question, during which it was pointed out that we did not send our coal out of the country for

nothing. It was a medium of barter for other commodities which were essential to us. For example, there was very little coal in Scandinavia and in the northern parts of Russia, and so we sent coal there, and received other goods in return. It was also to be remembered that our export coal trade provided freights in a large measure for our mercantile fleet, and prohibition of these exports would mean a great deal to our shipping industry. It was pointed out, however, that our exports of coal, especially coking coal, to Germany needed to be inquired into, as in the past that country had made many by-products out of our cheap coking coals, and exported her own coal to the detriment of our market.

**Shipowners' Profits.**—There may still be a few people who imagine that shipowners are making incredible profits. In the first two years or so of the war there was undoubtedly marked prosperity in shipping, and from the national standpoint as well as from any other the money was well earned. When we remember that while the Government had a strong navy to begin the conflict with, it had no transport of its own, and therefore this had to be provided entirely by private enterprise—the shipowners. Now the profits are greatly curtailed; in fact, many boats are running at a loss on Blue Book rates. Mr. Munro Sutherland showed how the latter had affected his company's fleet when addressing the recent annual meeting in Newcastle. The trading profits on the steamers dropped to £58,422 in the year under review, as compared with £198,468 in the previous year. Nine steamers which had been trading on Government account made a loss of £35,830. This sum had to be deducted from the total sum earned by the other ships of the company, and so left a net profit of £58,422. In 1916 the company's vessels made a profit of £296,952, and to get a figure of profit as low in the history of the fleet as that of last year it is necessary to go back to 1912, a dull year when tonnage was well in advance of the demand. The profit was then £52,397.

## THE MERSEY DISTRICT.

(From Our Own Correspondent.)

**Lamport & Holt Line as Shipbuilders.**—The announcement that the M'Millan Shipbuilding Company, at Dumbarton, are making some large extensions of their shipyard is interpreted here that the Lamport & Holt Line, Ltd., which recently acquired a controlling interest in this concern, intend to bring the yard into line with modern requirements.

**Mersey Port Rates Increased.**—The Mersey Docks and Harbour Board have decided that on and after May 20 the dock tonnage rates, harbour rates, and wharf rates at present charged on ships will be increased by 16⅔ per cent.; the dock rent at present charged on all vessels will be increased to 3d. per ton per week; and in lieu of the increase of 50 per cent. on the book rates at present charged on goods, an increase of 75 per cent. will be charged in respect of dock rates and town dues, foreign and coastwise. These increases are consequent upon further increases made in the wages of men in the Dock Board's employ, which in the case of the warehouse department alone has entailed an additional expenditure of £20,000 a year.

**A Shipping Deal.**—William Cory & Sons, Ltd., have purchased all the business undertakings of R. & J. H. Rea, which include, in so far as the Merseyside is concerned, the Mersey Elevators, the various coaling establishments, together with the Rea Shipping Company, Ltd., which comprises eight modern steamers, aggregating 16,000 tons, and the Rea Transport Company, Ltd., which has a fleet of about 14 coal lighters. The firm have besides well-established businesses at London, Cardiff, Southampton, Bristol, and Newcastle. The business of R. & J. H. Rea in Liverpool will be carried on without any change either in name or in the staff, but other details of the purchase are yet lacking.

**Liverpool Shipping Staffs' Association.**—The Liverpool Shipping Staffs' Association have just held another successful annual meeting, at which it was reported that the membership now totals 489, of which number about 65 per cent. are now with His Majesty's forces. This association, which is an offshoot of the Shipbrokers' Benevolent Society, has now a benevolent fund amounting to £2,367, which has been increased during the past year by the substantial sum of £645. The year's donations have amounted to £530, which includes a gift of £200 from Mr. John Rankin (shipowner). Mr. T. F. Harrison (Rankin, Gilmour & Co.) was re-elected president of the association for another year; Mr. E. C. Crossman was elected to succeed Mr. W. West as chairman, and Messrs. Dillon and Woof were re-elected secretaries.

**Liverpool and Newfoundland Freights.**—Lord Morris, during his recent visit to Merseyside, had a conference with the representatives of the Newfoundland trade in connection with the recent enormous increase in freight rates between Liverpool and Newfoundland. It was pointed out to him that the great hardship in the case was that large quantities of oil and fish and other produce were purchased for the British market without any expectation or warning of the great increase in the freight rate which, if insisted upon by the Ministry of Shipping, would mean the loss of thousands of pounds to purchasers in this country, as well as to the Newfoundland shippers. The rate of freight on fish had been increased by something like about 600 per cent., while at the same time the Food Controller had fixed the price at which the fish must be sold. Lord Morris undertook to discuss this matter with the Ministry of Shipping and the Colonial Office.

## SOUTH WALES DISTRICT.

(From Our Own Correspondent.)

**Bristol Channel Shipbrokers' Institute.**—The success which has attended the establishment of the Cardiff Institute of Shipbrokers, and the desire expressed by shipbrokers in other ports to join the organisation, led to a proposal to change the name of the Institute with a view to widen its jurisdiction. An intimation has now been received from the Board of Trade giving official sanction to the adoption of the new title of "The Bristol Channel Shipbrokers' Institute (Incorporated)," under which name it will therefore be known in future.

**Labour in the National Shipyards.**—The shipyard workers at Finch's yard, Chepstow, have passed a resolution protesting against the methods adopted in the working of the national shipyards. The resolution proceeds:—"We consider the employment of military labour under military discipline a breach of faith on the part of the Government, who pledged their word to trade unions that they would not conscript labour. We therefore call upon the Government to carry out their pledge, and that men from the army engaged in shipbuilding and munition works should be placed upon trade union wages and under trade union conditions. We further call upon the Government to carry out the pledge they gave that no existing shipyard should be taken over by them."

**Overtime Pay on Weekly Boats.**—At a meeting of the South Wales Maritime Board, held at Cardiff, an agreement was arrived at in regard to the conditions of employment of men engaged on weekly boats in regard to the hours of labour, and the rates of pay for working overtime. The agreement provides that for Mondays, Tuesdays, Wednesdays, Thursdays and Fridays, the recognised hours should be from 7 a.m. to 5 p.m., and on Saturdays from 6 a.m. to 1 p.m. for deck hands; and from 7 a.m. to 1 p.m. for firemen. The payment for overtime was fixed at 1s. 6d. per hour, except Sundays and holidays, when the rate of pay will be 2s. per hour. It was also decided that when overtime becomes payable in weekly boats, the basis shall be on overtime form now used for monthly steamers. No overtime is payable in weekly steamers where the usage is of alternative watches remaining ashore during the loading of boats. At the request of the Swansea Board, it was resolved to recommend that a South Wales Board be set up, covering the Cardiff, Swansea, and Newport districts, the headquarters to be at Cardiff.

**Bristol Channel Dock Charges.**—It is fully anticipated that very shortly sanction will be given to the proposed increase of dock charges at ports in the Bristol Channel. The application made to the Government by the Swansea Harbour Trustees for recognition of the port of Swansea as a controlled port was made necessary by reason of the financial losses which the Trust have endured since the outbreak of war. When Mr. J. G. Wardle, M.P., visited the port, as the representative of the Board of Trade, this aspect of the situation was put before him, and it is now thought that dock charges will be raised concurrently at all the Bristol Channel ports. It would, of course, be impossible to raise the dock charges at Swansea without a simultaneous increase being made at the other ports, or Swansea's trade would be further interfered with. The Trustees are confident that the Government will also allocate further tonnage to the port. It is rumoured in local shipping circles that the Board of Trade will issue an Order at an early date increasing the dock charges, and that, in the case of general goods, the new rates will be 50 per cent. above those now charged, and that the rates for tipping and weighing of coal will be doubled.

## THE FREIGHT MARKETS.

(From Our Own Correspondents.)

**London.**—Chartering business on the Baltic Exchange has been very quiet, the amount of free tonnage available being extremely limited. There is, therefore, competition of vessels. From the River Plate homeward rates remain at 225s. to the United Kingdom, and 250s. to France. On the North American Atlantic seaboard charterers there is a demand for vessels on net form of charter, the ruling rates being 220s. to the United Kingdom, 240s. to France, and 360s. to Italy, an additional 30s. being forthcoming for Gulf loading. For heavy grain the rate remains at 50s. from the Northern Range ports to the United Kingdom, 57s. 6d. to France, 75s. to Marseilles, and 77s. 6d. to West Italy. Some business is being done in carrying coal from Virginia to the Plate, for which business 80s. offers, while to Brazil, 84s. would be conceded. There is no change in the position so far as the Eastern section of the market is concerned. From Karachi to the United Kingdom, 250s. can be obtained on scale basis, and from Bombay, on d.w., 275s. to the United Kingdom, or 400s. to the Mediterranean. Kernel cargoes could be worked at 550s. from the Madras Coast to Marseilles. For rice, Burmah or Saigon would pay 500s. to the United Kingdom or France. A fair amount of tonnage continues to be taken up by the Mediterranean ore and phosphate ports, figures being without change, while in the Bay trade, several fixtures are reported at 17s. Bordeaux, and 20s. Bayonne to Bristol Channel.

**Glasgow.**—Chartering showed little sign of improvement, and although a few more fixtures were reported than in previous weeks, there was no real pressure of business, and the rates indicated were for most part nominal and approximate. The fixtures reported included:—Bordeaux, several steamers, Bristol Channel, 17s. prompt; Bayonne to Bristol Channel, 20s. prompt; Leith to Stockholm, 1,200, 187 kr.; steamer fixed on time charter, States and West Indies, 35s. one round trip; steamer fixed, Virginia to Iquique, about 69s., coal, prompt; and ship chartered, St. John, New Brunswick, to Australia, Fremantle-Sydney range, 132s. 6d., general cargo, August-September.

**Newcastle-upon-Tyne.**—Loading turns are still almost wholly monopolised by vessels awaiting cargoes of coal and coke on official account and traffic at the staiths has never been busier since war commenced. The volume of requisitioning of fuel for Government and Allied requirements is unabated and business booms at the collieries. There is a considerable pressure for coals and coke on neutral account, but, very largely, this is having to go unsatisfied, (1) because Government and Allied business must take priority, and (2) because neutrals are sending practically no tonnage forward, save in the case of Scandinavia. Scandinavian fixtures form the bulk of the chartering that has been done during the week. Christiania has been arranged for at 155 kr., as against 152½ kr. a week ago; Gefle at the steady rate of 195 kr.; Gothenburg at 157½ kr., 160 kr., 162½ kr., and (twice) at 170 kr., as compared with from 160 kr. to 166 kr.; Halmstad at 162 kr., as against 165 kr.; and Stockholm, 187 kr., as against 190 kr. On the whole, Swedish rates for prompt loading are weak, in view of the difficulty in securing loading turns, but forward rates are well maintained. The only fixtures in other directions have been one for Gibraltar at 100s., and one for London at the scheduled rate of 17s. There are numerous orders in circulation for Spain, Portugal and the Upper Mediterranean, but business is impossible in the absence of free tonnage and rates remain nominally on the basis of those quoted last week.

**Liverpool.**—A good inquiry continues on this market for outward tonnage, but with free ships being scarce, very little business can be done. Rates keep firm to all discharges. Sailing ship freight rates to French ports have been advanced by 7s. 6d. per ton for the carriage of coal, and by 8s. 6d. per ton for iron and steel goods. Time chartering is on the quiet side, though tonnage is keenly inquired after, and handy neutrals could get up to 50s. for twelve months. In the States-West Indies trade 35s. is still paid, but 41s. 6d. to 46s. 6d. is quoted in the Transatlantic trade according to size of vessels, and 40s. in the Pacific trade. Homeward freights are generally quiet and unchanged. Easterns would pay extreme rates for free boats, but the response is poor. Bombay quotes 450s. d.w. to Genoa, and 275s. to United Kingdom; Madras Coast to Marseilles 550s., and Burmah and Saigon 500s. to United Kingdom. North America is quiet and unchanged for grain at 50s. to United Kingdom, 57s. 6d. to France, and 77s. 6d. to Italy from the Northern Range. Firm rates are ruling for other classes of cargo. Nitrate ports indicate 190s. to United Kingdom, and River Plate homewards is unchanged at 225s.

**Cardiff and Swansea.**—There is nothing fresh to be recorded of the outward coal freight markets. Actual chartering operations have been on a small scale. Official tonnage continues in good supply. Merchants are offering 400s. for Barcelona, but owners are holding out for higher rates. The following fixtures for France were disclosed:—Havre, 47s. 3d. (neutral); Trouville, 48s. (neutral); Rouen, 48s. 9d. (neutral). A small sailing vessel was fixed for Lannion at 90s. On the Swansea market there has been a brisk demand for tonnage, especially for the limitation ports. The following fixtures were reported:—St. Malo, 45s.; Rouen, 48s. 9d.; La Rochelle, 61s. 6d.; Tonnay Charente, 61s. 6d. Neutral steamers are represented in each case.

**Hull.**—The market has a firm tone and there is a good demand for tonnage. In the North French market there is a very active demand for tonnage, both sail and steam, and it is for these destinations that the bulk of the tonnage supply is going. The West Italian market is firm with a moderate inquiry, but boats for these ports are very difficult to obtain. In the coastal trade to south country ports a rather active business is passing. The neutral markets are very quiet as tonnage cannot be spared for these trades.

## THE COAL MARKETS.

(From Our Own Correspondent.)

The remarkably firm tone which has been the prevailing feature of the coal markets throughout the country during the last few weeks continues, and shows no signs of diminishing. On the other hand, there are indications that the existing conditions will continue to be more pronounced as time goes on, the reason for this being mainly the great and growing demand for coal of all descriptions, coupled with the miners' comb-out, which is already having the effect of limiting outputs. On top of this is the fact that there is for the time being an abundance of available tonnage at the coal-exporting ports, and so the productions of the pits are readily got rid of.

With the demand so good, and facilities for disposing of the coal raised so excellent for the time being, prices have, of course, firmed up, and neutrals especially are having to pay considerably more than the official minimum prices, which remain about the same. In all cases it may be assumed that neutrals cannot purchase any sort of coal for less than 2s. 6d. a ton above market quotations, while, in some instances, sales have actually been effected at 5s. advance on the official figures.

The bunker coal trade is not brisk, except for bunkers of the special class for export, and for these the value is considerably higher than the quotation of 30s. Indeed, neutrals would probably have to pay 5s. to 10s. more. Ordinary bunkers are not very largely demanded, and the official price of from 24s. to 27s. 6d. holds good, though these coals are disposed of for other purposes than bunkers at about 2s. 6d. per ton more. In the South Wales market small steamers for bunkers are fairly plentiful, but the official price of 20s. to 24s. is realised without difficulty.

A feature of the North Country coal trade is the requirements of neutrals, who are pressing orders for early delivery of fuel, which they find it difficult to obtain. In fact, the position of the market is a very strong one, and so much coal is being absorbed by the authorities and for home needs that, with the reduced production caused by the calling-up of miners, there is very little left over for anyone, and neutral buyers are compelled to pay up to secure odd lots. The tonnage position continues to be very good, and the collieries are still working at full pressure.

There is an actual shortage of steam coal, and, in fact, of all classes of fuel, with the exception of smalls, which are still somewhat weak. Neutrals are paying as much as 50s. for parcels of best steam coal which will be available this month. There is a strong demand also for Durham gas coal, which is being sold at about 2s. 6d. above market quotations, and house coal is also in a strong position, while coke is not being produced in anything like the required quantity.

Approximate quotations are, for best Blyth steams, 30s. to 32s. 6d., and smalls, 18s. 6d. to 20s. 6d.; Tyne primes, 29s. 6d. to 32s., and smalls, 25s. to 27s. 6d.; second steams, 25s. 6d. to 29s. 6d., and smalls, 18s. 6d. to 20s. 6d.; unscreened steams, 24s. to 25s.; North Northumberland steams, 28s., and smalls, 20s.; smithies,

25s. to 30s.; nuts, 32s. 6d. to 33s. 6d.; Durham gas coals, 23s. 6d. to 30s.; coking coals, 17s. to 25s.; house coal, 20s. to 22s. 6d.; bunkers, 24s. to 27s. 6d., and specials, 30s.; foundry coke, 42s. 6d. to 45s., and blast furnace coke, 35s. 6d.

The South Wales coal market is still enjoying a boom period. The amount of new business passing has been by no means great, owing chiefly to the inability of colliery owners to entertain additional orders, but so great is the activity in loading, and so well has the supply of tonnage been kept up, that the pits are hard pressed to keep up the supply of fuel needed to satisfy current contracts.

Approximate prices are, for best steam coal, 35s. 6d.; second steams, 33s. 3d. to 34s.; ordinary steams, 32s. 6d.; drys, 31s. to 32s. 6d.; small steams, 20s. to 25s.; best large black veins, 32s. 6d.; Western Valleys, 31s. 6d.; Eastern Valleys, 30s. 6d. to 31s. 6d.; nuts, 30s. 6d. to 32s. 6d.; duff, 16s. 6d. to 20s. 6d.; house coal, 33s. 3d. to 35s. 6d.; No. 3 Rhonddas, large, 33s. 3d., and smalls, 28s. 6d.; No. 2 Rhonddas, large, 29s. 6d., and smalls, 19s. 6d. to 21s. 6d.; through and through coal, 24s. 6d. to 26s.; gas coal, 23s. 6d. to 27s. 6d., and patent fuel, 32s. 6d.

The position, so far as the Scottish coal markets are concerned, is unaltered. There continues to be very great pressure for coal of all descriptions, and this is especially the case in the West of Scotland, where the demand has for some weeks been on the increase, and is now very considerably in excess of the supplies. Much of the coal produced in the West of Scotland is consumed inland, and the manufactories are, in many cases, now carrying on a hand-to-mouth existence in regard to fuel. There is almost as strong a demand in Fifeshire and the Lothians, though the export trade is by no means considerable.

Prices, subject to the 2s. 6d. per ton war wage increase, are for splint coal, 28s. to 30s.; Hartleys, 29s.; Ell coal, 26s. to 28s.; screened navigations, 28s. to 30s.; unscreened navigations, 25s. 6d. to 29s.; screened steams, 27s. 6d.; and nuts, 21s. to 23s.

There has been no change in the position of affairs at Hull, where the coal market has an unusually firm tone, consequent on the ready absorption of all available supplies of coal. The market is still short of its needs, but the pits are unable to produce more. A considerable quantity of the coal coming into Hull is taken by the authorities, and exports to France are large. Prices are well maintained.

The London coal market has been quiet, but steady. There is not a great demand for house coal, consequent on the milder weather, but markets are taking all that comes to hand to add to their stocks. Steam coal is very freely absorbed. Taken altogether, the quantity of coal coming into London is fairly satisfactory.

## QUESTIONS IN PARLIAMENT.

### Import Restrictions.

Captain Barnett, on May 7, asked the Parliamentary Secretary to the Shipping Controller what steps were being taken to provide ship space for goods duly licensed and rationed by the Department of Import Restrictions as being necessary for war purposes in cases where such goods had not been specifically ordered by any Government department, but were of a class urgently required from time to time by various departments ex merchant stocks.

Sir L. C. Money: The provision of ship space for various classes of commodities is determined in accordance with the programme of importation approved from time to time by the War Cabinet, and in practice it is found that the goods licensed for import are invariably in excess of the available tonnage under the control of the Ministry of Shipping. This is necessarily the case, since there is always a certain amount of tonnage—allied and neutral—the detailed employment of which is outside the direct control of the Ministry.

### Turn-round and Handling of Shipping.

Colonel Royds, on May 8, asked the Parliamentary Secretary to the Shipping Controller whether any monthly or other returns were made showing the time and tonnage lost by reason of ships lying in harbour laden or partly laden, ships making passages only partly laden, ships making one port and having to discharge at another port, and delay in discharging or loading of ships; and, if so, whether he would publish returns from time to time showing the tonnage hours so lost.

Sir L. C. Money: The points raised in the question are met in practice by keeping a close watch on the movements of each ship individually. The circumstances are so diverse that this is the only method of dealing with the matter effectively. No return of the kind indicated is, therefore, available. I am glad to be able to add that, apart from necessary delays caused by the exigencies of war, there is exhibited a constantly increasing efficiency in the turn-round and handling of shipping.

Mr. G. Faber: Can the hon. Gentleman state whether any returns are made locally in Kent?

Sir L. C. Money: That is indicated in my reply.

### Facilities in Shipbuilding Yards.

Mr. G. Lambert, on May 8, asked the Civil Lord of the Admiralty whether, having regard to the fact that the losses by marine risk and hostile action of merchant shipping largely exceeded the tonnage built for the first four months of 1918, he could give the assurance that every private shipbuilding yard was supplied with as much labour as could be profitably utilised in the replacing and repair of tonnage.

Mr. Pretyman: I cannot yet answer this question definitely in the affirmative, but the Controller-General of Merchant Shipbuilding (Lord Pirrie) is satisfied that all practicable steps are being taken to utilise existing facilities in private shipbuilding yards to the utmost. My right hon. Friend is, of course, aware that considerable extensions of those facilities are now in course of progress, and for the proper utilisation of these further labour will be necessary.

### Protection Certificates.

Mr. Anderson, on May 8, asked the Parliamentary Secretary to the Ministry of National Service what steps had been taken to issue protection certificates to skilled workers between 41 and 51 years of age engaged in industries in which men of a lower age already held such certificates; and whether steps would be taken to place the older men on an equality with the younger men in essential industries in respect of the holding of protection certificates.

Mr. Beck: Instructions have been issued to the officials concerned to prepare certificates of protection for issue to men engaged on Admiralty, War Office, or munitions work who have become liable to military service in consequence of the provisions of the recent Military Service Act, and who would have been entitled to such certificates in respect of their occupation if they had been liable to service prior to the passing of the Act. These certificates are not yet ready for issue, owing to the great amount of clerical work involved, but instructions have been issued that the men affected are not to be called up for service, notwithstanding the fact that they do not yet hold the certificates.

### Clyde Riveters and Lost Time.

Mr. G. Terrell, on May 9, asked the Civil Lord of the Admiralty what was the number of riveters of military age employed in the Clyde shipyards who lost time on May 1 and 2; whether any of them had been called on to explain before a committee; and whether any of them had had their protection certificates withdrawn.

Mr. Pretyman: It will not be possible to get the information in the first part of the question asked by my hon. friend without detailed inquiry from each firm. I am informed that the time lost by the shipyard trades on the dates named was small in proportion to the number at work, and I do not propose to institute an inquiry, as it would involve a disproportionate amount of time and labour on the part of the clerical staffs of the firms and Admiralty Departments concerned. Answers to the second and third parts of the question are in the negative, because the Admiralty time-keeping scheme is only applicable to workers who habitually keep bad time and not to men absent on these specific dates, although absence on these dates might count in determining whether a man was an habitually bad time-keeper.

Mr. Terrell: Is my right hon. friend unable to give any information about these specific workers? He talked about workers generally. The question relates to riveters.

Mr. Pretyman: I have not any information as to riveters who are concerned more than others. The information I have is correct, that there was no specially large absence on that day.

Mr. Billing: Is not this a question of principle and not of hours, and under these circumstances would the Admiralty consider the advisability of inquiring into the case whether time is lost purely on a question of principle and not a question of time?

Mr. Pretyman: We do not inquire into cases where an individual man loses time on a particular day. What we inquire into is when time is habitually lost, and whether a man loses time on a particular day that contributes towards his becoming an habitual time loser. That is really the point.

**Persistent Bad Time-Keepers.**

Mr. Marriott, on May 14, asked the Secretary to the Admiralty whether he could state the number of shipyard workers who in each of the months of February, March and April, 1918, had been warned for persistently keeping bad time, and from how many men protection certificates had been withdrawn; and whether he was prepared to simplify and expedite the process by which protection certificates were withdrawn.

Dr. Macnamara: It has not been possible with the time at my disposal to obtain separate figures for shipyard workers only. But the number of persistent bad time-keepers employed in Admiralty firms who were warned in the months given was as follows:—

| | |
|---|---|
| February, 1918 ... ... .. ... | 975 |
| March, ,, ... ... . .. | 1,022 |
| April, ,, .. .. ... . | 1,353 |

Most of these men would be shipyard workers and marine engineers. Figures as to protection certificates withdrawn by direction of the Local Enlistment Complaints Committees from men in Admiralty firms are:—

| | |
|---|---|
| February .. ... ... ... ... | 19 |
| March ... .. . ... ... ... | 16 |
| April ... ... ... ... ... ... | 13 |

out of a total of 78 cases submitted to them in these months, 52 of which related to ship constructors and repairers and marine engineers in shipyards. In 21 cases the decision of the Committees had not been notified to the Admiralty at the end of April, while in 9 cases the Admiralty recommendation had not been approved. Proposals to simplify and expedite procedure had been submitted for their observations to the Joint Committee of the Shipyards Trade Unions and Shipbuilding Employers.

**Concrete Vessels.**

Mr. P. A. Harris, on May 8, asked the Civil Lord of the Admiralty whether he was aware that Italian concrete ships had been built and had been in regular service in the Mediterranean and in the Adriatic some 10 years; and whether he would state the tonnage of the largest British-built concrete sea-going vessel afloat and how many British-built concrete sea-going vessels of over 400 tons gross register were afloat.

Mr. Pretyman: It is, so I am informed, the fact that the first concrete vessels were built in Italy, but they were of very small dimensions and of no commercial value. In fact, some of them were small rowing boats. The largest concrete vessel actually afloat in English waters is a barge of a little under 400 tons, and this is the only one which has so far been launched.

**Construction of Concrete Ship.**

Mr. Harris, on May 8, asked how many reinforced concrete ships had been constructed in the United States; if any had reached this country to serve as a model for shipbuilders in the United Kingdom; and, if not, whether arrangements could be made for one of these vessels to visit England.

Mr. Pretyman: As far as I am aware the first reinforced concrete ship constructed in the United States was launched at San Francisco some six weeks ago. This vessel has a deadweight carrying capacity of 5,000 tons, but beyond this vessel no other of the same material has been launched. No vessel built of reinforced concrete has so far reached this country from the United States, and it is unlikely that the vessel which I have already referred to will be sent to the United Kingdom. Should it be found possible to send such a vessel across the Atlantic, my hon. friend may rest assured that every advantage will be taken of such a voyage in order to submit the vessel to a practical test and to obtain such information as will enable construction of vessels of similar types to proceed as rapidly as possible.

Mr. Harris: Have returns been obtained from America as to the success or otherwise of these particular ships of 5,000 tons?

Mr. Pretyman: We have had no experience. It was only six weeks ago that the ship was launched.

Mr. Wiles also asked the Civil Lord of the Admiralty, on May 8, whether he had received detailed technical information as to the sea-going vessel of 5,000 tons that had been launched in the United States, and of which a number of duplicates were being laid down; whether he would state if any encouragement was being given in this country, either to existing shipbuilders or newly-formed enterprises, to construct similar concrete ships of large tonnage; and why, having regard to the necessity of economising steel, the endeavours of his Department appeared limited to the construction of vessels and barges of only 1,000 tons and under.

Mr. Pretyman: Yes, sir, full particulars of the vessel to which my hon. friend refers have been received in this country, and full advantage is being taken of this information.

Every encouragement is being given by the Admiralty to this new industry, several newly-formed yards having been laid down specially for constructing concrete craft, while existing shipyards have been encouraged to form branch establishments for the same purpose without interference with the building of steel vessels. Whilst it is true that at present no vessels of more than 1,000 tons are being constructed to the order of the Admiralty, it should not be forgotten that there was a very urgent demand for vessels of small tonnage which could be rapidly constructed. In view of this, it was decided to concentrate on the smaller craft until more experience had been obtained as to the construction of such craft, and what is of much more importance, their behaviour when at sea. In a new method of construction such as this there are very many details of which full knowledge can only be acquired by experience. My hon. friend may rest assured, however, that the building of vessels of reinforced concrete is receiving the closest attention, and that every advantage will be taken of the knowledge that is being obtained.

## COMPANY MEETINGS.

**John I. Thornycroft & Co., Ltd.**—The adjourned general meeting was held on May 8, at Winchester House, London, E.C.

The Chairman (Mr. John E. Thornycroft, M.I.N.A.), in moving the adoption of the report, said they were somewhat disappointed with the settlements made with the authorities as regarded the pre-war standard of profits and allowances for increased output, but other troubles had arisen from the proposed arbitrary treatment of some items in the accounts. They had, however, now ascertained their liabilities for taxation approximately. With the balance brought forward they had a total of £105,277, out of which to pay debenture interest, dividends, &c., and to transfer a further £25,000 to reserve account, bringing the general reserve up to £125,000, in addition to the special reserve account of £50,000, making a total of £175,000. In the balance sheet the goodwill, patterns, drawings, and patent rights now stood at the purely nominal sum of £1,000. There was no use in disguising the fact that the company's goodwill as regarded the commercial vehicle and marine motor business, which had cost a very large amount to build up, had been very largely lost by reason of the whole of their resources having been monopolised by the Government for war work. It was no exaggeration to say that they had had to refuse thousands of orders, and, in addition, to stand by and see their old customers purchase vehicles and engines of other makes, in most cases American. As against that they had had remarkably successful results from the work they had turned out. That would undoubtedly help them in reopening their trade, but it must be accompanied with a considerable amount of expenditure in advertising, and very energetic and probably expensive propaganda work. In connection with the Reconstruction Committee which had been formed, there was a committee to deal with the disposal of surplus property after the war. The company's interest in the matter referred mainly to the enormous number of motor lorries which would be left on the hands of the Government, and, in connection with other commercial vehicle manufacturers, they were endeavouring to get some reasonable scheme accepted. The outlook from the point of view of the shipbuilding and marine engineering business after the war was healthy, and, with their increased facilities, there was no reason why they should not secure their fair share of the work which would be offering. They confidently looked forward to a very considerable amount of business after the war.

Mr. Alexander Glegg, J.P., seconded the motion, which was carried.

**Sutherland Steamship Company, Ltd.**—The annual meeting was held on May 8 in the Company's offices, Newcastle-on-Tyne.

The Chairman (Mr. A. Munro Sutherland), in moving the adoption of the report and balance sheet for the year ended March 31, 1918, said he was sorry that the profit available for dividend purposes from the steamers' trading account was only £58,423, against £198,469 the previous year, being a reduced trading profit of £140,046. This was largely accounted for by the fact that nine of the steamers

which had been trading on Government account had made a loss of £35,830, which, of course, had to be deducted from the profit made by the other steamers owned by the company before arriving at the net profit of £58,423. In previous years the company had shown the following profits from steamers' trading account, viz., 1916, £296,952; 1915, £109,841; 1914, £69,512; 1913, £109,093; 1912, £52,397; they therefore had to go back to 1912 before the company's steamers showed such a poor result as this year. He was pleased to report that representations were being made to the Ministry of Shipping, and shipowners hoped that the "Blue book" rate would be increased so as to help them to meet the very large increased expenditure which had become necessary since this rate of remuneration was fixed by the Government, and thus enable them to continue trading their steamers for the benefit of the country without loss. Shipowners had rendered invaluable service to the State, and it appeared grossly unjust that they should be compelled to run any of their steamers at a loss whilst the Ministry of Shipping were earning with these steamers the full current rates of freight, and thus making huge profits from the trading of their steamers. It might be interesting to know that during the past four years, whilst the shareholders had received in dividends the sum of £206,739, the company had been called upon to pay over £386,000 to the National Exchequer for income tax and excess profits duty —in short, the nation took £180,000 more than the shareholders received in dividends. These facts ought to be more widely known, so that everyone might have some idea of what British shipowners were doing for their country. The Chairman stated that he was sorry, but amused to see in the Press recently a letter in which it was stated that "shipowners in the Newcastle district were seldom at their offices, and then only for an hour or so a day, and that their clerks did not know how to fill up their time." He absolutely contradicted that statement, and assured the shareholders that such a state of affairs did not occur in their office. He himself was at the office early and late, and was kept busier now than he had ever been during his life. The office staff were very much overworked, and working overtime; holidays had been reduced, and all were feeling the strain and stress; but, at the same time, all the members of the staff felt it their duty to stick in and do their bit during these days of hardship.

Mr. Henry Cail seconded the motion, which was agreed to.

## COMPANY REPORTS AND DIVIDENDS.

**Moss Mek. Verkstad.**—The dividend for 1917 is 10 per cent.

**Stavanger Stoberi og Dok.**—A dividend of 15 per cent. has been declared.

**Pacific Steam Navigation Company.**—The directors have declared a dividend for the year 1917 of 7½ per cent.

**A.G. Weser, Bremen.**—The directors recommend 12 per cent. dividend for 1917, compared with 10 per cent. for 1916.

**Ozean Dampfer A.G., Flensburg.**—A dividend of 20 per cent. is declared for the past financial year, and it has been decided to double the share capital (to £118,000).

**Schiffswerfte u. Maschinenfabrik. vorm. Janssen-Schmilinsky.**—After making liberal provision for depreciation, it is proposed to pay 10 per cent. dividend (same as last year).

**Deutsche Dampfschiffahrts Gesell. Kosmos, Hamburg.**—Exemption has been obtained from the statutory obligation to publish accounts and call a general meeting in respect of 1917.

**Schiffswerft Henry Koch A.G., Lubeck.**—A dividend of 7 per cent. is recommended on a share capital of £176,000, compared with 7 per cent. last year on £29,000 old shares and 3½ per cent. on £147,000 new shares.

**Wm. Cory & Son, Ltd.**—The directors recommend payment of a final dividend of 6 per cent., less income tax, on the ordinary shares and employees' shares, making, with interim dividend of 4 per cent. paid in December, 10 per cent., less tax, for year ending March 31 last, together with a bonus of 10 per cent. free of tax.

**Bruckenbau Flender A.G., Benrath.**—The net profit for 1917 was £46,900 (£27,000 last year) after allowing £9,800 (£9,800) for depreciation. A dividend of 20 per cent. (16 per cent.) has been paid. Orders in hand amount to £880,000 and specially large orders are said to have been received this January and February. Prospects are favourable," provided that regular working can be maintained." The proviso is curious, if not significant.

**Marine Insurance Company, Ltd.**—The directors recommend a dividend of £2 5s. per share, less income tax. Of the accruing dividend £1 2s. 6d. per share, less tax, was paid on January 10 last, and the balance will be paid on July 10. The directors further recommend that £50,000 be put to reserve fund, making that fund £600,000.

**Royal Mail Steam Packet Company.**—Subject to audit of the accounts for the year 1917, the directors recommend payment of the usual half-yearly dividend on the preference stock; and a balance dividend of 5 per cent., less income tax, on the ordinary stock, making, with interim dividend paid in November last, a total of 7 per cent. for the year.

**Neue Dampfer Cie., Kiel.**—Traffic of all kinds was brisk during 1917 and practically all the company's vessels were fully occupied throughout the year. There was neither time nor opportunity for much maintenance and repair work which would have been done under normal circumstances. The net profit was £20,500 (compared with £20,200 last year) and a dividend of 10 per cent. was again paid.

**Bremer Vulkan, Schiffbau u. Maschinenfabrik, Vegesack.**—The gross profit for 1917 amounted to £267,000. Taxes, interest, welfare expenses and war allowances absorbed £105,000; and depreciation £56,000 (compared with £38,900 last year). The net profit was £111,000 (£68,400), from which was paid 20 per cent. dividend (12½ per cent. last year) and £12,900 in directors' bonuses. The yard is fully occupied with orders for the current year.

**Cressington Steamship Company, Ltd.**—The report for 1917 shows a profit, after providing for excess profit duty and income tax, of £27,163, against £34,570 the previous year; including £7,998 brought forward, there is an available sum of £35,161. After placing £8,500 to reserve, bringing that fund up to £10,000, a further dividend of 7 per cent. is declared, making 10 per cent. for the year, the balance being carried forward. Last year 20 per cent. was paid.

**Clan Line Steamers, Ltd.**—In addition to the final dividend of 10 per cent., free of income tax, making 20 per cent. for the year, already announced, £25,000 has been added to pensions and benevolent fund, and £50,966 carried forward, after allowing for depreciation of steamers. Last year 25 per cent. was paid, with £50,000 to a pension and benevolent fund, £487,640 to a special reserve fund from insurance money on three vessels lost, being the amount in excess of their book value, and £36,560 carried forward.

**St. Thomas Dock, Engineering & Coaling Company, Ltd.**—The report for the year ended December 31, 1917, states that the cost of necessary materials for repairs, and rates of freight and insurance thereon, have risen considerably, and much difficulty has been experienced in obtaining material and shipping it when obtained. Early in the year there was a strike of the labourers in St. Thomas, which was settled by granting substantial increases of pay. Receipts have been satisfactory, and it is proposed to pay the balance of the preference dividend.

**P. & A. Campbell, Ltd.**—The report for the year ended December 31, 1917, states that after payment of interest on preference shares of 6 per cent. per annum and an interim dividend of 5 per cent. (being 10 per cent. per annum) on ordinary shares, there remains £33,960 (including £9,822 additional balance from 1916, being arrears of hire) which the directors propose to deal with as follows: To sinking fund (raising same to £159,275) for year 1916, £12,500, and for 1917, £11,775; final dividend of 5 per cent. on ordinary shares, free of income tax, making 10 per cent. for year, £2,500; balance to carry forward, £7,185. The rate of hire of steamers requisitioned by the Admiralty has been agreed upon, and the claims for compensation for loss of two steamers have been settled.

**Danish Dividends.**—According to *Borsen*, the Vendila firm proposes to pay 35 per cent. dividend. The Torm concern realised £212,500 profit in 1917 and, after allowing for repairs, depreciation and taxes, &c., the directors propose to pay 80 per cent. dividend. The East Asiatic Company proposes to pay 45 per cent. from its profit of £1,970,000; although the company has a bank balance of £2,760,000 at present, it is proposed to raise the capital from £1,380,000 to £2,760,000 in order to provide for increasing the fleet and dealing with the general problems of the future. The Havnia firm owns eight vessels, but only three were in service, and these realised a net profit of £301,000, from which a dividend of 65 per cent. is paid. By transferring £100,000 from reserve the share capital is doubled. The reserves amount now to £102,000.

## COMPANY REGISTRATIONS.

**Debenture Marine Insurance Company, Ltd.**—Capital, £500,000, in £1 shares. Objects, to carry on the business of marine insurance in all its branches, &c. Signatories :—

C. Hall, The Elms, Cheadle, Staffs., colliery owner.
J. Russell Ferguson, 47, Avonmore Road, West Kensington, W., coal exporter.
J. H. Bowden, 9, St. Matthew's Avenue, Surbiton, Surrey, chartered accountant.

The first directors are to be appointed by the subscribers. Registered office : 7, East India Avenue, E.C. 3. Private company.

**Eastern Company of Transport and Insurance, Ltd.**—Capital, £100,000, in £1 shares. Objects, to carry on the business of shipowners, ship and insurance brokers, managers of shipping property, barge owners, lightermen, wharfingers, &c. Signatories :—

W. H. Mugford, 1, Strathearn Road, Wimbledon, S.W., solicitor's clerk.
C. H. Brookes, 3, Worcester Gardens, Grandison Road, Clapham Common.

The first directors are to be appointed by the subscribers. Solicitors : Spyer Bros., Austin Friars House, E.C. Private company.

**Great Britain Insurance Corporation, Ltd.**—Capital, £100,000, in £1 shares. Objects : To carry on the business of marine insurance in all its branches, to insure ships, vessels, boats and craft of all kinds, goods, merchandise, live or dead stock, luggage, &c. Signatories :—

R. Keedwell, 51, Stembridge Road, Anerley, S.E.20, law clerk.
G. E. T. Stebbing, 33, Rosebery Road, S.W.2, law clerk.
J. F. West, 9, Lewes Road, Bromley, Kent, law clerk.
F. Skinner, 14, Salcombe Gardens, Clapham Common, S.W., secretary.
J. H. Skinner, 3, Cranley Gardens, Palmers Green, N., merchant.
H. Morgan, 62, London Wall, E.C.2, incorporated accountant.
A. P. Cork, 1, Copthall Chambers, E.C., stock and share broker.

Minimum cash subscription : 7 shares. The first directors are : G. E. R. Adair, H. Newton Knights, R. Sewell, H. A. Francis and P. Butterworth. Qualification, 100 shares. Registered office : 5, Copthall Court, E.C.

**West Pier Steam Trawling Company, Ltd.**—Capital, £5,000, in £1 shares. Objects : To acquire the steamship or trawler *Ayacanora*, registry No. 838 at Aberdeen, together with the boats, fishing and other gear, and to carry on the business of steamship owners, smack and trawler owners, &c., and to enter into an agreement between W. H. Sellers of the one part and F. C. Gardiner for the company of the other part. Signatories :—

E. Owston, 97, Garfield Road, Scarborough, butcher.
C. Crawford, 125, Longwestgate, Scarborough, fish merchant.
J. W. Dinnewell, 127, Longwestgate, Scarborough, fish merchant.

The first directors are : T. Shone, C. Owston, C. Crawford, C. Watson, and F. Tate. Qualification, £100. Solicitor : T. W. Outhet, 5, York Place, Scarborough. Private company.

**Bradford Shipping Company, Ltd.**—Capital, £65,000, in 1,000 6½ per cent. first non-cumulative preference shares of £10 each, 2,000 8 per cent. non-cumulative preference shares of £10 each, 1,000 10 per cent. non-cumulative preferred ordinary shares of £10 each and 25,000 deferred shares of £1 each. Objects, shipowners, shipping agents, freight contractors, carriers, &c. Agreement with James Bell, Jun., trading as "James Bell & Co." Signatories :—

J. Bell, jnr., Fleet Chambers, Jameson Street, Hull, shipowner.
Miss J. W. Bell, 468, Anlaby Road, Hull.

Managers : James Bell & Co. Registered office : Fleet Chambers, Jameson Street, Hull. Private company.

**Transatlantic Insurance Company, Ltd.**—Capital, £100,000, in £1 shares. Objects, to carry on all kinds of marine, transit and other insurance (except life insurance, the granting of annuities on human life, fire, accident and employers' liability insurance and bond investment business). Signatories :—

Capt. C. T. O. Callaghan, 47, Clarendon Road, W.
N. Alwyne Bury, 173, Nottingham Road, Derby, bombardier, R.G.A.

The first directors are to be appointed by the subscribers. Qualification, 100 shares. Solicitors : Cohn & Co., 52, New Broad Street, E.C. Private company.

**Charles H. Johnstone, Ltd.**—Capital, £15,000, in £1 shares. Objects : To carry on in the United Kingdom and elsewhere the business of haulage and carting contractors, carriers by land and water, railway, shipping and forwarding and passenger agents, barge and steamship owners, agents and charterers, ship brokers, stevedores, lightermen, and wharfingers, &c., now carried on at 11-13, Rumford Street, Liverpool, and 523, Hawthorne Road, Bootle, as "Charles Henry Johnstone." Signatories :—

G. W. Rankin, Claremount, Belgrave Road, Great Crosby, general merchant.
J. L. Rankin, 19, Orrell Lane, Walton, Liverpool, general merchant.
C. H. Johnstone, Windyhaugh, Highfield Crescent, Great Sankey, near Warrington, haulage contractor.

The first directors are :—C. H. Johnstone (permanent managing director and chairman), G. W. Rankin and J. L. Rankin. Solicitor : W. F. Gorst, 40, North John Street, Liverpool. Private company.

**Commercial Timber Company, Ltd.**—Capital, £2,000, in 1,850 preference shares of £1 each and 3,000 ordinary shares of 1s. each. Objects : Timber merchants, wharfingers, tug, barge and vessel owners, sawmill proprietors, &c. Signatories :—

R. W. Walker, 24, Buxton Road, East Ham, E., timber merchant.
H. Andrews, 61, Welbeck Road, East Ham, E., accountant.

The first directors are to be appointed by the subscribers. Solicitor : W. Cook, 59, Gracechurch Street, E.C. Private company.

**Guarantee Marine, Ltd.**—Capital, £5,000, in £1 shares. Objects : To carry on the business of marine insurance in all its branches, to insure ships, vessels, boats and craft of all kinds, &c. Signatories :—

E. Crawley, 8, Alfriston Road, Clapham Common, S.W. 11, solicitor's managing clerk.
F. H. Smith, 15, Barnard Road, Clapham Common, S.W. 11, cashier.

The first directors are to be appointed by the subscribers. Registered office : 30, Great St. Helens, E.C. 3. Private company.

## NEWS PARAGRAPHS.

**Australian Shipbuilding.**—Australia is contracting for the construction of another twelve ships. The full programme will increase the Commonwealth Trading Fleet to 65 vessels.

**Argentine Shipping Deal.**—According to the United States Consul-General at Buenos Aires, an important shipping transaction was concluded recently in Buenos Aires when Dodero Hermanos bought the entire fleet of the Marina Mercante Argentina for account of the Lloyd Americano for £650,000. Dodero Hermanos (Italian) control the Lloyd Americano, while being at the same time large shareholders in the Marina Mercante Argentina.

**Dundee Harbour Rates.**—The Finance Committee of Dundee Harbour Trust have recommended the trustees to make application to the Board of Trade for power to levy a further increase of 33⅓ per cent. on the schedule rates, thus enabling the trustees to levy rates to the extent of 100 per cent. above pre-war rates. The trustees agreed to adopt the recommendation and to make application to the Board of Trade. If sanction is granted it is proposed to bring the new rates into operation at June 1.

**Tyne Challenge to Thames Riveter.**—The fine performance of Mr. R. Farrant, employed by Messrs. Fraser, of Bromley, who put in 4,276 rivets with a pneumatic tool in a day of nine hours, has resulted in a challenge from Geo. Palmer, a Newcastle-upon-Tyne riveter, to a match with pneumatic tools for any sum up to £200, the match to be decided in a neutral shipyard in the United Kingdom on any part of a ship over a full working day or a full working week. Mr. Palmer has signified his readiness to make an immediate deposit to bind a match.

**Port Co-operative Movement in Italy.**—After the Venetian concession and the Naples port authority, a co-operative movement for the port of Savona is well on the way. "Then," says *La Marina Mercantile Italiana*, "there comes Spezia with a projected consortium to include representatives of the provinces, the district consumers, the Chamber of Commerce, and a credit establishment." The projected new port works of Spezia are estimated to cost 15,000,000 lire and to provide accommodation for 14 large steamers and a number of smaller vessels.

**Making Ships Unsinkable.**—The United States Shipping Board has perfected a device for the protection of merchant vessels against torpedo attack. It consists of temporary bulkheads, which double the number of watertight compartments in each ship. These bulkheads will be placed midway between those already installed. They will be built at first of concrete, but as they can equally well be made of wood and steel, these materials, which are said to be cheaper, will be employed later on. The construction consists of an H-shaped steel beam, to sustain the water pressure, and four-inch planking.

**Ekenbergs Yard.** The owners, Stockholm Transport o. Bogserings A. B., propose to extend the yard equipment to build ships up to 6,000 tons d.w. capacity.

**Swedish Yards.**—According to the German consular report from Gothenburg, all Swedish yards are fully occupied with orders for several years ahead. It is estimated that from 250,000 to 300,000 tons is on order.

**Triester Freie Schiffahrts A.G.**—It is proposed to raise the share capital from £666,666 to £1,333,333, in order to cover the cost of new vessels. The company has 12 vessels under construction, totalling 116,000 tons.

**Dutch Shipbuilding.**—*Het Nederlandsche Zeewezen* estimates that 430,000 gross tons of shipping (excluding war vessels and river craft) was under construction or on order in Dutch yards at the end of last year. Owing to the scarcity of materials it is impossible to estimate where these vessels will be completed.

**A Pirate Chief.**—According to *Hansa*, the Kaiser has sent congratulations and thanks to von Arnauld de la Periere, commander of U-35, and to the whole crew of this vessel, which, it is claimed, has sunk no fewer than 196 vessels (totalling about 500,000 gross tons) in the Mediterranean whilst under its present commander.

**New Steamship Service.**—The Uchida Steamship Company, a sister company of the Uchida Trading Company, is arranging to open up regular steamer service between the United States and Oriental ports, chiefly in Japan and India, for which the Trading Company is now making effective preparations for opening up traffic.

**A.S. Standard Skibsbyggeri.**—This firm has been established with a capital of £166,000, with headquarters at Christiania, in order to develop a shipyard near that city for the construction of steamships from 6,000 tons d.w. upwards. Olaf Olsen, of the Fredriksstad mek. Verksted, is named as manager of the new concern.

**U.S. Shipbuilding Record.**—A Reuter message from Washington states that a new shipbuilding record is declared to have been established by the launching of a 5,500-ton steel ship at Camden (New Jersey) shipyard. The vessel, which was to have been completed on June 15, has left the ways 27 days, 2 hours and 50 minutes from the time the keel was laid, or 41 days ahead of contract time.

**Concrete Shipbuilding in America.**—Mr. Hurley, chairman of the United States Shipping Board, has asked Congress for $50,000,000 for the development of concrete shipbuilding. The plan is to establish at once five Government yards, two on the Pacific Coast and three in the South. The concrete ship *Faith*, built on the Pacific Coast for private account, is almost ready to undertake a voyage.

**American Output of Ships.**—The following report from Washington has been issued by the Press Bureau:—The Shipping Board announce that during the week ended May 5, 10 steamships, of a total tonnage of 57,695, and six wooden ships, of 21,500 tons, have been launched by American yards. In the same period 12 steel ships, of a total of 80,180 tons, have been delivered complete and ready for service.

**Tonnage Lost during the War.**—The German Admiralty claims to have sunk during the month of March 689,000 gross tons of shipping belonging to the Allies or in the Allies' service. It is claimed that by "war measures" alone the world's tonnage has sustained a total loss of 16,469,000 gross tons since the beginning of the war. On the usual German basis this corresponds to a claim of 9,700,000 net tons total loss.

**Japanese Shipbuilding.**—A recent compilation of the destination of new Japanese shipping to be launched this year is as follows:—Sold to Great Britain, 148,000 tons; sold to France, 23,000 tons; sold to Italy, 5,600 tons; for service between Japan, United States, Russia and British territories, 51,000 tons; for service between British territories, 16,700 tons; not settled, but likely to be sold to the Allies, 87,000 tons.

**Norwegian Tonnage Losses.**—During April, 10 Norwegian vessels of an aggregate gross tonnage of 13,704 tons were destroyed through causes of war, and 20 sailors lost their lives. Since the beginning of the war 755 Norwegian vessels have been lost through the war, with an aggregate gross tonnage of 1,115,519 tons, and 966 sailors have lost their lives, while 53 vessels with aggregate crews of more than 700 seamen are missing.

**Belfast Harbour Rates.** At a meeting of the Belfast Harbour Board last week Mr. W. E. Williams, J.P., referred to the decrease in the volume of vessels using the port, and stated that imports and exports showed a decrease for last year. The Finance Committee had no option but to recommend further increases in rates, these to take the form of ½d. per ton on cross-Channel and coastwise vessels, and 3d. per ton on foreign vessels. The new schedules, with these alterations, to come into operation at once.

**Germany and Dutch Shipping.**—According to a Reuter message from Amsterdam, the *Cologne Gazette*, commenting on Germany's latest regulation, by which neutral vessels are to be regarded as sailing for the enemy if the State whose flag the vessel is entitled to fly has concluded a tonnage agreement with an enemy State, terms it "a clear warning to neutrals." "This regulation," continues the journal, "must also be applied to neutrals the greater part of whose merchantmen have been seized by the enemy and are now forced to sail under an enemy flag."

**Neutral Shipbuilding in 1917.** The *Neuen Zuricher Zeitung* quotes the following figures for the shipbuilding production of neutral countries in 1917:—Holland, 185 vessels, 150,000 tons; Norway, 76 vessels, 48,000 tons; Sweden, 48 vessels, 39,000 tons; Denmark, 38 vessels, 24,000 tons; Spain, 11 vessels, 23,000 tons; total, 284,000 tons gross. In reproducing these data, *Hansa* asserts that the world's loss of shipping from the outbreak of war to April 1, 1918, amounts to a total of about 19,000,000 tons gross, and that the vessels built during that time do not amount to more than half this tonnage.

**German Views on Motor Tugs.**—Writing in *Hansa*, H. Gerstmeyer points out that motor tugs are little used for large vessels and barges in port service, although they are used to an ever increasing extent in canal work. Under the general economic conditions prevailing at present, it is considered that there is a good case for the use of crude oil motors in harbour tugs; coal supplies are difficult to obtain and operation on oil saves space, weight and fuel costs. In addition, a motor is always ready for immediate service, and it is possible to use much better ship lines, thus reducing the bow wave and effecting further operating economies; for the same reason, a motor tug is to be recommended for running through ice. The writer suggests that every encouragement be offered to shipyards to develop the best combination of motor and hull for tug service.

**Seamen's Hostel for Tees-side.**—Sir Hugh Bell announced to this month's meeting of the Tees Conservancy Commissioners that, through the initiative of the Seamen's Mission, subscriptions aggregating to £2,480 had been collected for the establishment of a seamen's hostel in Middlesbrough. He reminded the Commission of the number of seamen using the port—naval men, men of the merchant service, and, frequently, crews of torpedoed ships—for whom it was necessary to find accommodation often at a moment's notice. Even after the war there was reason to believe that similar accommodation would be required. The amount subscribed did not represent the limit of ambitions of the promoters, but was sufficient to ensure the carrying out of the project. The Commission decided to vote £500 towards the hostel, which is to be opened at an early date, two houses in Queen's Square having been secured in which accommodation for about 50 men will be provided.

**Repairs on Oil-Carrying Ships.**—New repair rates for work on oil-carrying vessels, other than tankers, have been provisionally agreed upon for the Leith District at a central conference of engineering employers and trade unionists. Before the men are started an expert's certificate is to be obtained to the effect that the tanks are absolutely safe, such certificate to be posted in some conspicuous place. Where oil has been carried in bulk as last cargo, in double bottom, side tanks, deep tanks, or fore and aft peaks, the rates to be paid to men working on board are to be (*a*) Time and a half to men employed in tanks where oil has been carried, including shell and tank tops in connection therewith; and (*b*) time and a quarter to men employed on the cargo oil suction and discharge pipes, valves, and valve boxes, and on the pumps used for oil fuel. Where oil is carried in barrels or cases no allowances are to be paid. The extra rates are to be calculated on the new work rates, and no further allowances of any kind are to be paid. Overtime is to be paid for at double time in the case of men coming under provision (*a*) and at time and three-quarters in the case of men coming under provision (*b*). The extras are to be calculated on the basis of the new work rates. The provisions of the agreement are not to apply when tanks have been cleaned, and have not carried oil on the previous voyage; nor are they to apply to other parts of the vessel than those specified.

**Newport Harbour Board.** The revenue statement for the past month shows a decrease of £27 in the dues received. No casualties have occurred in the River Usk during that period.

**Wages in British Columbia Shipyards.**—The Imperial Munitions Board will grant the 10 per cent. increase of wages in the British Columbia shipyards recommended by the Provincial Commission.

**Bristol Channel Timber Importers.**—At a meeting of the Association the question of the Whitley Report was considered, and the principle of Industrial Councils, as suggested by the Commission, was approved.

**Trade of Swansea Harbour.**—The returns show that imports last month totalled 44,282 tons, and exports amounted to 290,759 tons. These figures compare with 47,559 tons and 286,234 tons in the corresponding period last year. For the past four months the imports were 146,590 tons, and exports 1,079,764 tons, compared with 165,145 tons and 1,013,089 tons in the first four months of 1917.

**Protection Against Submarines.**—Mr. Joynson Hicks, on May 8, presented a petition in the House of Commons, signed by upwards of 16,000 persons, including members of both Houses of Parliament, asking for the necessary steps to be taken to direct that a certain number of German prisoners or interned Germans should be carried on all merchant ships as a protection to seamen and civilians travelling thereon, in view of the submarine policy of our enemies.

**Spanish Shipping Requisitioned.**—According to a Reuter message from Madrid, it is announced that, as a result of a meeting of the Cabinet, a decree providing for the requisitioning of the entire merchant fleet of Spain will be promulgated immediately. The Food Bureau has opened an inquiry with the object of affording to shipowners an opportunity to submit their views in regard to this step. Simultaneously with the requisitioning order a Council of Administration possessing the functions of a Board of Control will be established, on which the shipowners themselves will be duly represented.

**American Shipbuilding Rivalry.**—A Reuter message from New York states that large sums of money are being wagered by American shipyard workers on the Atlantic and Pacific coasts on the speed with which they can turn out wooden ships. The management of an Oregon shipyard recently wagered $20,000 (£4,000) that its yard would turn out more ships in a given time than a company in Massachusetts. When the employees of the Oregon yard learned of it, they at once requested that they might take over the entire wager themselves. The request was granted, with the result that work in both yards is now going on at top speed. A report in a New York newspaper, that a crew of ship-riveters at Baltimore had established a remarkable speed record, brought a telegraphic challenge from riveters in a San Francisco yard, who accomplished a record considerably in excess of that made in Baltimore.

## SEAGOING FERRO-CONCRETE SHIPS.

### Instructions to Shipbuilders and Shipowners.

The Marine Department of the Board of Trade has issued the following preliminary instructions for the information of builders and owners of seagoing ferro-concrete ships and for the guidance of the Board's surveyors :—

These vessels will require to comply with the requirements of the Merchant Shipping Acts.

All vessels which proceed to sea, except sailing vessels and dumb barges under 80 tons register solely employed in the coasting trade, must be marked with a loadline as required by Section 438 of the Merchant Shipping Act, 1894, and Section 7 of the Merchant Shipping Act, 1906. The position of the loadline is regulated by the requirements of the Tables of Freeboard (1909), and depends on the strength of the hull.

In order that the authority, to whom application will be made for the assignment of a loadline, may be fully informed of the structural arrangements upon which the strength of the hull of a ferro-concrete ship depends, full information as to the intended arrangements must be supplied by the builder to that authority, and the vessel must be built under the inspection of the surveyors of that authority.

The builders of such vessels should accordingly make application for the assignment of a loadline as soon as possible, and in any case before construction is commenced, either to Lloyd's Register, the British Corporation, the Bureau Veritas or to the Board of Trade.

The application should be accompanied by detailed calculations of the strength of the vessel, drawings showing the construction of the vessel and arrangements of reinforcements in detail, and a general specification of the materials to be used and the methods of construction to be followed.

Board of Trade surveyors are instructed to bring this circular to the notice of all persons building or proposing to build ferro-concrete ships and also to advise the principal ship surveyor as soon as possible whenever preparations for the construction of such vessels are brought to their notice.

When an application for assignment of a loadline has been received, the surveyors are to exercise a close inspection of the construction of the hull in all its stages, and very full reports should be forwarded to the Board as to the manner in which the work has been carried out in each case.

The loadline disc and the marks in connection therewith are to be permanently marked on a steel plate 33 in. by 18 in. by ¼ in., embedded in the concrete flush with the outside and suitably secured.

Instructions of a more detailed character will be issued for the surveyors' guidance in due course.

If application for assignment of a loadline to an unclassed vessel is made to the Board of Trade, a special fee of £5 will be payable in addition to the prescribed fee for loadline survey in the case of a steel or wood vessel.

## THE HUDSON BAY ROUTE TO THE UNITED KINGDOM.

The following particulars are given in the *Board of Trade Journal* with regard to the advantages of the Hudson Bay route to the United Kingdom :—

Three considerations—the reduction of 1,000 miles of rail haul in the distances that now separate the granaries of the West from the Liverpool warehouses, with consequent lowering of the cost of transportation both ways, the prospect of large and rapid expansion in volume of production in New Manitoba and the Prairie Provinces, and the demands made upon the railway facilities by the present agricultural output—make out the case, in the view of the Western Canadian business community, for the Hudson Bay route to the United Kingdom.

### Progress of Work.

The building of a harbour at the mouth of the Nelson River has not been easy. The drainage basin of the Nelson includes all the Canadian prairies, the Red River valley in the United States, and Ontario up to a point 70 miles west of Fort William. This means that the Nelson is a very large river. It carries down great quantities of silt, which are deposited at the mouth of the channel, creating extensive sand bars and an unstable river bottom which will requre constant dredging.

An island is being formed near the mouth of the Nelson, which is reached by a steel bridge, and, while engineering mistakes appear to have been made, it is authoritatively stated that the most difficult work is done, and the building of a substantial dock is now only a matter of time.

### Annual Period of Navigation.

In regard to the length of time during each year that navigation is possible in the Hudson Bay, there is general agreement that for four months of the year, including August, September and October, with parts of July and November, the strait can be safely sailed. There will no doubt be many years when navigation can be carried on safely from June 1 to the end of November. The success of Canadian ice-breakers at Archangel has helped to increase confidence in this northern route.

### Routes from England to the East.

From England to Eastern Asia via Suez is a distance of about 16,000 miles. By way of New York and San Francisco it is about 11,000 miles, and by way of Seattle or Vancouver about 10,000 miles, but by way of Port Nelson and Prince Rupert it is less than 8,000 miles, and, to use the language of the North, "the portage" from Port Nelson to Prince Rupert is much shorter than that on either of the other systems.

# OFFICIAL NOTICES AND SHIPS FOR SALE.

**THOS. PINKNEY & SONS**

(Thos. Pinkney, S. Renny Pinkney, David R. Pinkney).

**SHIPPING AUCTIONEERS.**

BROKERS FOR THE SALE AND PURCHASE OF STEAMERS, &c.

**LICENSED VALUERS.**

VALUATIONS FOR WAR LOSS, PROBATE, SALE, &c.

**BALTIC CHAMBERS, SUNDERLAND.**

Telegrams: "SPARDECK."

MARINE ENGINEER with offices at Cardiff Docks whose special business has practically been closed down by the War Restrictions, open to undertake Representation, or Surveying, or assistant, or Work of National Importance, established. Replies treated in strict confidence. Box 161, c/o *Shipbuilding and Shipping Record*, Queen Anne's Chambers, Westminster, London, S.W.1.

THE Proprietor of the Patent No. 1377 of 1914 for "Improvements in or relating to Barges" is desirous of entering into arrangements by way of license and otherwise on reasonable terms for the purpose of exploiting the same and ensuring its full development and practical working in this country. All communications should be addressed in the first instance to HASELTINE, LAKE & CO., Chartered Patent Agents, 28, Southampton Buildings, Chancery Lane, London, W.C.2.

ENGINEERING FIRM with well equipped Machine Shops, now engaged on Munitions, solicits enquiries for all classes of Turning, Drilling, Grinding, Milling, Fitting, &c. Aircraft Fittings, also Copper Pipe work a speciality. Correspondence with a view to Post War Business especially invited. The Lankester Engineering Co., 39, Eden Street, Kingston-on-Thames.

SITUATION wanted as Foreman Ship Rigger. Reliable at heavy lifting. Can work to plans and "Lloyd's Rules." Reply Box 1,212, c/o *Shipbuilding and Shipping Record*, Queen Anne's Chambers, Westminster, London, S.W.1.

**OFFICIAL NOTICES AND SHIPS FOR SALE.**

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Wednesday.

All advertisements should be addressed to—

*Shipbuilding and Shipping Record*,

Queen Anne's Chambers,

Westminster, London, S.W.1.

## "SHIPBUILDING AND SHIPPING RECORD" TABLE OF SHIP SALES.

| Name and Type. | Tonnage. | Dimensions. Draught in ( ). | Sold by, to | Builders, hull and year. | Machinery and builders. | Remarks. |
|---|---|---|---|---|---|---|
| **Carl,** ss. (part awning dk.) (ex *Weybridge*) | 2,486 gr. 1,610 net 3,600 d.w. | 297½′ × 39½′ × 18¾′ (20′ 3″) | Dampsk. Akties. Kalundborg, Kalundborg, to Akties. Dampskibs. "Orion," Copenhagen | Sir Raylton Dixon & Co., Middlesbrough (1890) | 22, 35, 50 × 39 (J. Dickinson, Sunderland) | Price about £137,500. Sold in 1916 for £100,000. |
| **Gledhow,** ss. (single dk.) | 2,661 gr. 1,723 net 4,100 d.w. | 306½′ × 41½′ × 19½′ (22′) | Lucovich, Parsons & Co., London, to the Transport & Trading Co., London | W. Gray & Co., W. Hartlepool (1891) | 23, 36½, 62 × 39 (Central Marine Eng. Wks., W. Hartlepool) | — |
| **J. B. Stetson,** ss.(single dk.) | 837 gr. 521 net | 181′ × 39½′ × 13½′ | Hicks-Hauptman Nav. Co., San Francisco, to buyers not stated | Hall Bros., Winslow, Wash. (1905) | 12½, 20½, 34 × 24 (Risdon Iron Works, San Francisco) | Price about £35,000. |
| **Lord Rhondda,** ss. | 1,744 gr. 1,026 net 2,500 d.w. | 260½′ × 37¾′ × 16½′ (17′ 2″) | E. Plisson, Cardiff, to the Redlands Shipping Co., London | Wood, Skinner & Co., Newcastle (1918) | 20, 33, 54 × 36 (J. Dickinson & Sons, Sunderland) | — |
| **Nehalem,** ss. (single dk.) | 632 gr. 367 net | 173′ × 39′ × 13½′ | Hicks-Hauptman Nav. Co., San Francisco, to buyers not stated | H. J. Price, Fairhaven, Cal. (1910) | — | Price about £32,000. |
| **Temple E. Dorr,** ss.(single dk.) | 720 gr. 453 net | 176½′ × 38′ × 12½′ | Hicks-Hauptman Nav. Co., San Francisco, to buyers not stated | Built at Hoquiam, Wash. (1907) | — | Price about £30,000. |
| **Throstle,** ss. (single dk.) | 2,293 gr. 1,399 net | 290′ × 45½′ × 19′ | Ogmore S.S. (1899) Co., Cardiff, to the Scarisbrick S.S. Co., Cardiff | W. Pickersgill & Sons, Sunderland (1912) | 22, 37, 61 × 39 (G. Clark, Sunderland) | — |
| **William Wallace,** ss. | 4,215 gr. 2,630 net 7,400 d.w. | 364¾′ × 51′ × 26′ | R. W. J. Sutherland, Cardiff, to Macvicar, Marshall & Co., Liverpool | Sir Raylton Dixon & Co., Middlesbrough (1917) | 25, 41, 68 × 45 (Richardson, Westgarth & Co., Middlesbrough) | — |

**Swedish-Russian Shipping Company.**—It is proposed to establish this company in Stockholm with a capital of at least £55,000 in order to maintain line service between Swedish and Russian Baltic ports.

**Portuguese Steamer Service to Brazil.**—The *Agencia Americana* reports from Rio de Janeiro, that the Portuguese Government intends again to consider offers for a direct service of steamers with Brazil, with which country the successive disappearance of the transatlantic lines calling at Lisbon is continually reducing communications. Three recent German ships will be ceded to the contractors to ensure the service. The *Jornal do Commercio*, of Rio, states that a large company is being formed with Portuguese and Brazilian capital to tender for this concession.

**Shipbuilding in Nova Scotia.**—A report on the activities of the Shipbuilding Commission of Nova Scotia, issued on February 23, estimates the shipbuilding programme, exclusive of fishing schooners, now being carried out in Nova Scotia, at 30,000 tons. This tonnage comprises only ships (three or four masts) of 250 to 750 tons each. The output during 1917 was 20,000 tons. The Commission claims that Nova Scotia is suitable for the foundation of a large steel shipbuilding industry. One steel vessel has already been completed and placed in commission by a firm in New Glasgow, a second is about to be launched, and a third is well under way. The difficulty at present is the supply of ship plates, angle irons, &c. Nova Scotia itself is rich in raw materials, can easily be equipped to furnish manufactured parts, and offers a choice of excellent sites for a shipyard.

**Legislation on Emigration.**—Mr. Long, the Colonial Secretary, has introduced in the House of Commons a Bill "to improve the existing organisation for affording information and assistance to those who wish to emigrate from the British Islands and to provide for the establishment and powers of a central emigration authority, and for the supervision and control of passage brokers and passage brokers' agents, and emigration societies, and for purposes in connection therewith." The Bill has been read a first time.

**Swedish Shipping and Shipbuilding.**—The Stockholm correspondent of the *Economist* reports that the great scarcity of tonnage and the difficulty of contracting for new vessels abroad has had a stimulating effect on the Swedish shipbuilding trade. Several new shipyards have been started, amongst them one of the largest in the country, the Landskrona shipyard, and many of the old yards have undergone considerable extension. The Landskrona shipyard has four beds, whereof two are for 4,000-tonners, one for 15,000, and a fourth bed for 20,000 tons d.w. steamers. The largest dry dock in Scandinavia is also under construction at this yard, capable of accommodating steamers up to 20,000 tons size.

## FORTHCOMING EVENTS.

INSTITUTION OF ELECTRICAL ENGINEERS.—Thursday, May 23, meeting at the Institution of Civil Engineers, Great George Street, Westminster, S.W., at 6 p.m. Professor E. W. Marchant on "Some Transient Phenomena in Electrical Supply Systems."

## SHIPPING SHARE MARKET.

There has been a welcome improvement in the stock and share markets during the past week, and prices of shipping companies' shares are in most cases better, whilst shipbuilding and iron and steel issues also show a distinct tendency to harder prices. Royal Mails put on a full point on the declaration of the dividend of 7 per cent. on Pacific Steam Navigation shares which the company controls, and Peninsular and Oriental deferred has also been better with several bargains marked. Among the lower-priced shares may be noted activity in Court Lines, which have changed hands a number of times between 35s. 9d. and 36s., but the chief feature has been Tyne-Tees Steam Shipping shares (10s. paid), which have been in strong demand on reports that the company is to be absorbed by a larger undertaking. The buying appears to have emanated from Newcastle and rapidly spread to London, where bargains have been marked as high as 29s. 3d. No information is yet obtainable regarding the reports, respecting which the company's officials will say nothing. There is a rise of about 5s. per share during the past fortnight. Cunards are being bought at 85s., but dealings are still confined to the ordinary shares, there having been no transactions in the preference and debenture stocks since last month. The reduction in the dividend of the Clan Line from 25 per cent. to 20 per cent. for the year did not seriously affect the market in the shares, which was maintained at around 44. In the shipbuilding section, and iron and steel shares generally, there have been many enquiries for the leading descriptions. Vickers, Armstrong Whitworths, Wilsons and Clyde (on the dividend), Blaenavons (on rumours of possible amalgamation with Baldwins), Rhymney iron shares (on anticipations of a good dividend), and other shares have advanced in price. The dealings on the Cardiff market in Blaenavons are reported to have been very heavy of late, but there is no definite information to justify the buying except the knowledge that the company has been doing very well. Babcocks have been advanced on rumours that the dividend is to be put up. The market appears to be generally crediting the companies with the probable payment of larger dividends all round.

## SHIPPING, SHIPBUILDING, ENGINEERING AND MARINE INSURANCE SHARE LIST.

### SHIPPING.

| Name. | Share and paid. | Extreme quotations, 1917. | Last ann. div. % or per share. | Yield. % | Last Quotation | Rise or Fall. |
|---|---|---|---|---|---|---|
| | £ | | | | | |
| African S.S. .. ... ... | 20 | 30⅜—25⅜ | 10 | 7⅛ | 28 | |
| Allan Line ... ... Deb. | 100 | — | 4 | 4⅜ | 92 | |
| Anchor Line ... Cum. pref. | 10 | 9⅛—8⅜ | 5⅛ | 5¾ | 8⅝ | − ⅛ |
| Do. ... ... Deb. | Stk. | 105⅜—102⅛ | 4½ | 4⅜ | 103 | |
| Argentine Nav. ... Cum. pref. | 1 | 25/—14/3 | 6 | 5½ | 22/9 | |
| Do. ... ... Ord. | 1 | 20/6—6/6 | Nil. | Nil. | 16/6 | − -/3 |
| Australasian Un. S. Nav. Deb. | Stk. | 80⅛—79⅜ | 4 | 5 | 81 | |
| Belfast Steam ... ... "A" | 10 (5pd.) | — | 5 | 5 | 5 | |
| British & Argen. Nav. ... Deb. | Stk. | 84—80 | 4⅜ | 5¼ | 80⅛ | |
| British India Nav. ... Deb. | Stk. | 84—82 | 4⅛ | 5⅛ | 81¼ | |
| British S.S. Invest. Trust Def. | Stk. | 460—344¼ | 50* | 11⅛ | 427 | |
| Do. ... ... Pref. | Stk. | 105⅛—104 | 6 | 5⅞ | 102 | |
| Do. ... ... Deb. | Stk. | 74¼—70 | 4⅜ | 6 1/16 | 72 | |
| Cairn Line ... ... Deb. | Bds. | 94—90 | 5 | 5⅛ | 90⅜-91 | |
| Do. ... ... ... Ord. | 1 | 51/6—40/9 | 20† | 8 | 54/- | |
| Clan Line ... ... Ord. | 10 | 55½—26⅝ | 25 | 5⅛ | 44 | |
| Court Line ... ... ... Ord. | £1 | 40/6—29/6 | 10 | 5¼ | 35/9 | + -/9 |
| Cunard SS. ... ... Ord. | 1 | 85/—63/9 | 20* | 5 | 84/- | −1/- |
| Do. ... Cum. pref. | Stk. | 97¾—82 | 5 | 5¾ | 85⅞ | |
| Do. ... ... Deb. | Stk. | 100—93¼ | 4⅜ | 4⅝ | 98 | |
| Elder Line ... ... Deb. | Stk. | 95—89 | 4⅜ | 4⅜ | 103 | |
| Elder Dempster ... Cum. pref. | 1 | 19/—17/- | 5⅜ | 6¼ | 19/- | |
| Do. ... ... Deb. | Stk. | 89—85 | 5 | 5⅞ | 83½ | |
| Ellerman Lines ... Pref. Ord. | 10 | 9½—8⅜ | 6⅛ | 6¼ | 9¼ | |
| Do. ... Guar. pref. | 10 | 9—8¼ | 4¾ | 5¼ | • 8¼xd | |
| France Fenwick ... Cum. pref. | 5 | 95/3—85/- | 5⅜ | 6¼ | 87/6 | |
| Furness, Withy ... Ord. | 1 | 60/9—41/6 | 20* | 6⅜ | 63/3 | + -/3 |
| Do. ... Cum. pref. | 10 | 9—7¾ | 5 | 5⅞ | 8⅜ | |
| General Steam Nav. Ord. | 1 | 24/9—21/6 | 10 | 7⅜ | 30/6 | + -/1⅛ |
| Do. ... ... Pref. | 1 | 19/4⅛—15/- | 5 | 6¼ | 15/6 | |
| Houlder Line ... Cum. pref. | 5 | 82/6—75/- | 5⅜ | 6⅞ | 79/8¼ | |
| Do. ... ... Deb. | Stk. | — | 4⅜ | 4⅝ | 91 | |
| Houlder Bros. ... Cum. pref. | 5 | — | 5⅜ | 6⅜ | 4 | |
| Do. ... ... Deb. | Stk. | — | 4⅜ | 5⅜ | 82 | |
| India Gen. Nav. & Rly. ... Ord. | 10 | 11⅜—8⅞ | 6 | 5⅜ | 11⅜ | |
| Indo-China N. ... Pref. Ord. | 5 | 97/6—87/6 | 6 | 6⅜ | 97/6 | |
| Irrawaddy Flotilla ... ... | 40 | — | 12½ | 5 | 100 | |
| Khedivial Mail ... ... Ord. | 1 | 40/—24/- | 20 | 12¾ | 36/- | − 1/- |
| Do. ... ... Pref. | 5 | 76/3—70/- | 5⅜ | 7⅜ | 72/6 | |
| Do. ... ... Deb. | Stk. | 95⅜—93 | 4⅜ | 4⅝ | 94¼ | |
| King Line ... ... Ord. | 1 | 42/6—31/6 | 12 | 5⅜ | 44/9 | |
| Lamport & Holt ... Cum. pref. | £1 | 20/4⅛—18/- | 6 | 6 | 19/4½ | |
| Leyland (F.) ... Cum. pref. | 10 | 8⅜—7½ | 5 | 5⅞ | 8 3/16 | |
| Mercantile SS. ... ... Ord. | 5 | 30⅛—15 | 40 | 8 | 30½ | |
| Do. ... ... Pref. | 1 | 21/—15/9 | 5 | 6¾ | 21/- | |
| Moor Line ... ... Ord. | 10 | 35—20 | 30 | 6⅝ | 41 | |
| Nelson Steam Nav. ... Deb. | 100 | — | 5 | 5⅛ | 98⅜ | |
| New Zealand ... ... Ord. | £10 | — | 8 | 2⅜ | 32½ | |
| Do. ... ... Deb. | Stk. | 87½—86⅜ | 4 | 4⅝ | 88⅜ | |
| Nitrate Producers SS. ... Ord. | 5 | 25⅜—20 | 30 | 6¼ | 24⅜ | |
| Do. ... Cum. pref. | 5 | 100/—90/- | 5 | 5 | 5 | |
| Oceanic Steam. Nav. ... Deb. | 100 | 98⅛—84 | 4⅛ | 4⅜ | 94⅜ | |
| Orient.Stm.Nav.Co. Cum. pref. | 10 | 9¼—8⅜ | 5 | 5¾ | 9⅛ | |
| Do. ... ... Deb. | 100 | 92—88 | 4⅜ | 5⅛ | 88 | |
| P. & O. S. N. ... Cum. pref. | 100 | 93¾—84 | 5 | 5⅝ | 89½ | − 2⅜ |
| Do. ... ... Def. | 100 | 342—295 | 18 | 5⅜ | 331 | + 4 |
| Do. ... ... Deb. | Stk. | 65⅛—63⅛ | 3½ | 5⅜ | 63 | −1 |
| Prince Line ... ... ... | 1 | 6⅜—3 7/16 | 30 | 5⅛ | 117/6 | |
| R.M.S.P. ... ... Ord. | 100 | 125—109½ | 7 | 5¼ | 119⅜ | |
| Do. ... ... Pref. | Stk. | 85⅜—80 | 5 | 6 | 87 | |
| Do. ... ... Deb. | Stk. | 86—79 | 4⅜ | 5⅜ | 78½ | − ⅛ |
| Shaw, Savill & Alb. Cum. pref. | 5 | 87/6—80/- | 5¼ | 5⅞ | 85/- | |
| Shell Transport ... ... Ord. | 1 | 6¼—96/3 | 35 | 6¼ | 5⅜ | |
| Do. ... Cum. pref. | 10 | 9¼—9⅛ | 5 | 5⅜ | 9⅛ | |
| Sutherland SS. Co. ... ... | £1 | 75/—50/9 | 30 | 5⅜ | 101/- | |
| Union-Castle SS. Cum. pref. | 10 | 7⅞—7⅛ | 4⅛ | 6 | 7⅜ | |
| Do. ... ... Deb. | Stk. | 90—86 | 4 | 4⅜ | 90 | + 1 |
| West Hartlepool ... ... Pref. | 10 | 7¾—7⅛ | 5⅛ | 7¼ | 7⅛ | |

### INSURANCE.

| | | | | | | |
|---|---|---|---|---|---|---|
| Alliance ... ... ... ... | 20 (2·4 pd.) | 10⅛—9 | 12/ | 7 | 10 | |
| London Assurance ... ... | 25 (12½ pd.) | 60⅛—46⅝ | 22 | 7 | 64⅜ | + ⅜ |
| Merchants' Marine Insurance ... | 10 (2½ pd.) | 10⅜—6⅞ | 10 | 6 | 10 1/16 | |
| N. British & Mercantile Ord. | 25 (6¼ pd.) | 36—29 | 40/- | 6⅜ | 34 | |
| Phœnix Assurance ... ... | 10 (1 pd.) | 7⅛—6 | 40 | 7 | 7 3/16xd | |
| Royal Exchange Assurance ... | Stk. | 241⅛—187 | 10 | 4¼ | 251 | |
| Sea Insurance ... ... | 10 (2 pd.) | 27½—24⅞ | 10 | 6 | 27 | |
| World Marine, Limited ... | 5 (2 pd.) | 6¼—55/ | 10 | 8 | 7 | + ¼ |

### IRON AND STEEL.

| Name. | Share and paid. | Extreme quotations, 1917. | Last ann. div. % or per share. | Yield. % | Last Quotation | Rise or Fall. |
|---|---|---|---|---|---|---|
| | £ | | | | | |
| Babcock & Wilcox... ... Ord. | 1 | 68/—52/6 | 15 | 4⅛ | 66/3 | + 1/3 |
| Baldwins ... Cum. pref. | 1 | 20/—15/- | 5½ | 5⅜ | 20/- | |
| Do. ... ... ... Deb. | Stk. | 84—82 | 4⅜ | 5⅛ | 84 | |
| Bayliss, Jones ... Cum. pref. | 1 | — | 5 | 7⅛ | 1 1/16 | |
| Bell Bros. ... ... Cum. pref. | 10 | 10—9⅜ | 6 | 6 | 10 | |
| Do. ... ... ... Deb. | Stk. | 80—73¾ | 5 | 7 | 74 | |
| Bessemer (Henry) ... Ord. | 1 | 34/6—24/6 | 12⅛ | 7⅜ | 32/- | |
| Bolckow Vaughan ... Ord. | 1 | 30/—22/2 | 11 | 7⅜ | 27/7½ | |
| Do. ... ... Cum. pref. | 20 | 17⅛—16½ | 5 | 5⅜ | 16/9 | |
| Cargo Fleet Iron ... ... Ord. | 1 | 24/9—17/3 | 3 | 2⅜ | 25/6 | − -/6 |
| Do. ... ... ... Deb. | 100 | 84—81½ | 4⅛ | 5⅛ | 82 | |
| Consett Iron Co. ... ... Ord. | 1 | 36/3-24/10⅜ | 50 | 10 | 95/- | |
| Dominion Iron & Steel ... ... | Bds. | 88⅜—71⅜ | 5 | 7 | 73 | |
| Dorman, Long ... ... Ord. | 1 | 50/—30/9 | 8† | — | 35/3 | − -/7½ |
| Do. ... ... ... Deb. | Stk. | — | 4 | 5¼ | 71 | |
| Ebbw Vale Steel & Iron Ord. | 1 | 30/6—24/6 | 12⅛ | 9 | 30/1⅛ | + -/7½ |
| Guest, Keen & Nettefids Ord. | 1 | 89/—62/6 | 15* | 3⅜ | 82/6 | |
| Do. ... ... Cum. pref. | 5 | 5⅞—5 | 5 | 4⅛ | 5 5/16 | |
| Do. ... ... ... Deb. | Stk. | 79¾—73¾ | 4 | 5¼ | 77 | |
| Hadfield's Steel Foundry Ord. | 1 | 107/6—78/6 | 30 | 5⅝ | 100/6 | |
| Ibbotson Bros. ... ... ... | 5 (4 pd.) | 7—6½ | 7⅛ | 4¾ | 6½ | |
| Jessop (W.) & Sons ... Ord. | 5 (4 pd.) | 10—8 | 15* | 6⅜ | 9½ | |
| Lanarkshire Steel Cum. pref. | 10 | — | 5 | 7⅛ | 7 | |
| Lysaght (J.) ... Cum. pref. | 1 | 25/—20/- | 6 | 6 | 20/6 | + -/6 |
| Do. ... ... 2nd pref. | 1 | 19/9—19/4½ | 6 | 6 | 20/- | |
| Manganese Bronze ... Ord. | 1 | — | 6 | 11 | 11¼ | |
| Do. ... ... Cum. pref. | 1 | — | 6 | 8 | 3¼ | |
| North-Eastern Steel ... Deb. | Stk. | — | 4⅛ | — | — | |
| Palmers Ship & Iron "A" ... | 1 | 13/—9/9 | Nil. | Nil. | 13/9 | |
| Scott (Walter) ... ... Ord. | 1 | 29/4½—21/3 | 15 | 10⅜ | 26/4½ | |
| Do. ... ... ... Pref. | 1 | 19/9—16/- | 6 | 7⅜ | 19/9 | |
| Sheffield Forge ... ... Ord. | 1 | — | 15 | 4¼ | 70/- | |
| Shelton Iron & Steel ... Ord. | 1 | 24/6-16/10⅜ | 7⅛ | 6 | 21/- | + -/4⅜ |
| Do ... ... ... Deb. | 100 | 91⅜—91 | 5 | 5⅜ | 91⅜ | |
| S. Durham Steel & Iron Ord. | 1 | 42/9—29/6 | 10 | 4¾ | 44/- | |
| Do. ... ... Cum. pref. | 1 | 20/9-18/7½ | 6 | 6½ | 20/7½ | |
| Do. ... ... ... Deb. | Stk. | 81—80 | 4⅛ | 5⅛ | 80 | |
| Steel Co. of Scotland ... Ord. | 10 | — | 10 | 6½ | 15⅜ | |
| Stewarts & Lloyds Pref. ord. | 10 | 17—16 | 10 | 6½ | 16 | |
| Do. ... ... Cum. pref. | 10 | — | 6 | 4⅜ | 13 1/16 | |
| Stone (J.) ... ... Cum. pref. | 10 | 8⅛—7⅛ | 5 | 6⅜ | 7 1/16 | |
| United States Steel ... Ord. | 100$ | 124—109⅛ | 8 | 7⅛ | 96½ | |
| Do. ... ... Cum. pref. | 100$ | — | 7 | 7⅛ | 114 1/16 | |
| Vickers Ltd. ... ... Ord. | 1 | 44/6—35/3 | 12⅛ | 5⅞ | 41/7½xd | −1/7½ |
| Do. ... ... ... Pref. | Stk. | 84—81 | 5 | 6 | 82 | |
| Do. ... ... ... Deb. | Stk. | 79—74⅜ | 4 | 5 3/16 | 76 | |
| Weardale Steel ... Def. ord. | 1 | 32/3—23/- | 19⅛ | 13¾ | 28/9 | − -/3 |
| Do. ... ... Cum. pref. | 1 | 25/3—18/9 | 6 | 5⅞ | 24/9 | |
| Do. ... ... ... Deb. | Stk. | — | 4 | 6⅜ | 62 | |
| Workington Iron & Steel Ord. | 1 | 30/3—21/- | 10 | 6⅜ | 28/9 | |

### SHIPBUILDING AND MARINE ENGINEERING.

| | | | | | | |
|---|---|---|---|---|---|---|
| Armstrong, Whitworth Ord. | 1 | 45/—36/- | 12½ | 5⅞ | 41/3 | − -/1⅛ |
| Do. ... ... Cum. pref. | 5 | 7⅜/9—6⅞/- | 4 | 5⅜ | 6⅞/6 | |
| Do. ... ... ... Deb. | Stk. | 78—73 | 5 | 6⅜ | 75⅛ | |
| Beardmore (W.) ... ... Deb. | 100 | 93—89 | 4⅜ | 5 | 95¾ | + 5¾ |
| Brown (John) ... ... Ord. | 1 (15s. pd.) | 29-/—22/9 | 12½ | 7 | 28/3 | |
| Do. ... ... Cum. pref. | 10 | 8⅛—7⅞ | 5 | 5⅜ | 8⅛ | |
| Cammell Laird ... ... Ord. | 5 | 7⅛—6¾ | 10 | 7⅛ | 6⅞xd | |
| Do. ... ... Cum. pref. | 5 | 85/6—74/6 | 5 | 6½ | 76/10⅛ | |
| Do. ... ... ... Deb. | 100 | 83⅛—79⅜ | 4⅜ | 5⅜ | 84 | |
| Dunlop (Jas.) ... ... Ord. | 1 | 28/9—16/- | 10 | 9⅜ | 22/3 | |
| Do. ... ... Cum. pref. | 1 | 18/9—16/6 | 6 | 7⅜ | 17/6 | |
| Fairfield Shipbldg Cum. pref. | 10 | 8¾—8⅜ | 6 | 7⅜ | 8⅜ | |
| Fleming & Ferguson ... Ord. | 10 | — | 10 | 7 | 14½ | |
| Gray (Wm.) ... ... Deb. | 100 | 100—95⅜ | 4½ | 4⅝ | 97½ | |
| Hawthorn (R. & W.) Leslie Ord. | 1 | — | 12⅜ | 6¼ | 38/6 | |
| Henderson (D. & W.) Cum. pref. | 1 | — | 5 | 9 | 9 1/16 | |
| Richardsons Westgarth Ord. | 1 | 10/3—5/- | Nil. | Nil. | 9/3 | − -/2¼ |
| Do. ... ... Cum. pref. | 1 | 19/9—12/6 | Nil. | Nil. | 18/- | |
| Do. ... ... ... Deb. | Stk. | 67—62 | 4⅜ | 6⅞ | 66 | |
| Simons (W.) ... Cum. pref. | 10 | — | 5 | 5 | 9 1/16 | |
| Swan, Hunter & W. R. ... Ord. | 1 | 51/—33/6 | 12⅜ | 5⅜ | 52/3 | |
| Do. ... ... Cum. pref. | 1 | 17/3—17/- | 5 | 5⅜ | 18/6 | |
| Do. ... ... ... Deb. | Stk. | 78—77 | 4¼ | 5⅜ | 73 | |
| Thornycroft (John I.) ... Ord. | 1 | 45/—16/- | 17⅜ | 8¼ | 38/-xd | −1/9 |
| Do. ... ... Cum. pref | 1 | 19/—16/- | 6 | 6⅜ | 18/7½ | |
| Do. ... ... ... Deb. | 100 | — | 5 | 5¼ | 82⅝ | + ⅜ |
| Wallsend Slipway ... Ord. | 1 | 2—1⅛ | 10 | 2¾ | 39/6 | |
| Do. ... ... Cum. pref. | 1 | 1—1 | 5 | 5 | 19/- | |

* Including bonus. † Also 20 % in shares. ‡ Treasury price.

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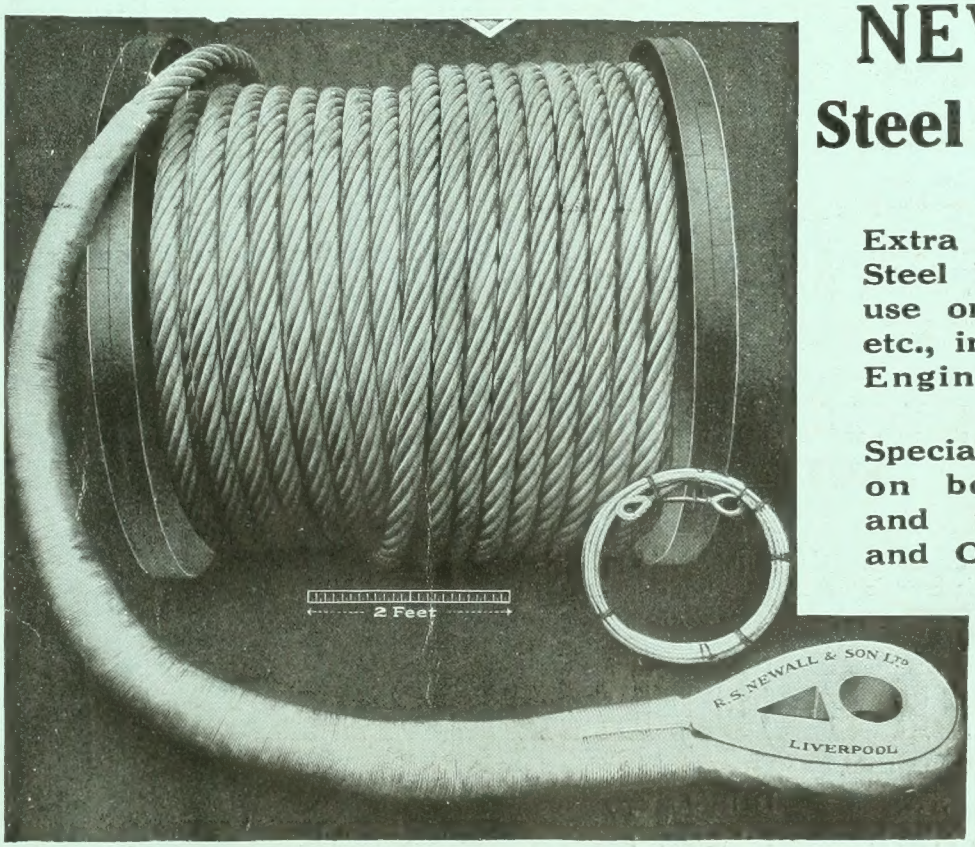


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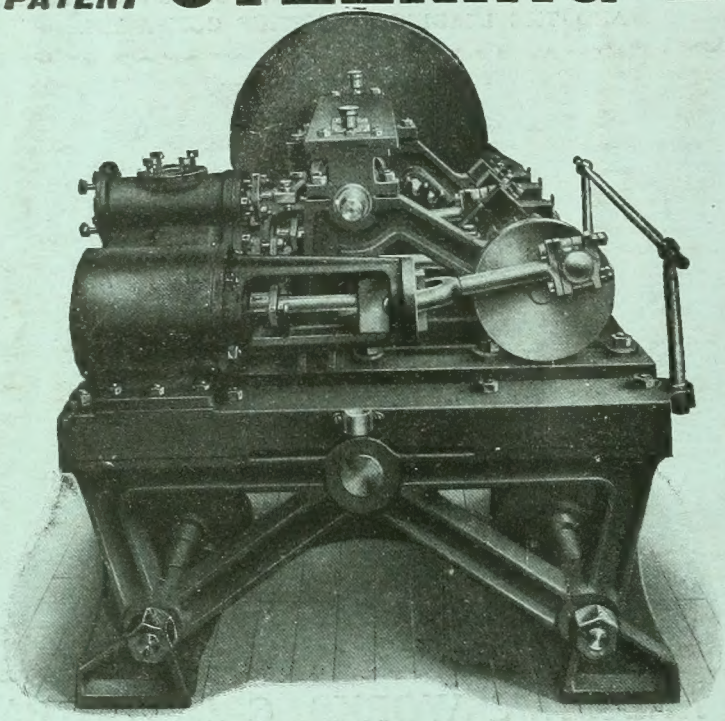

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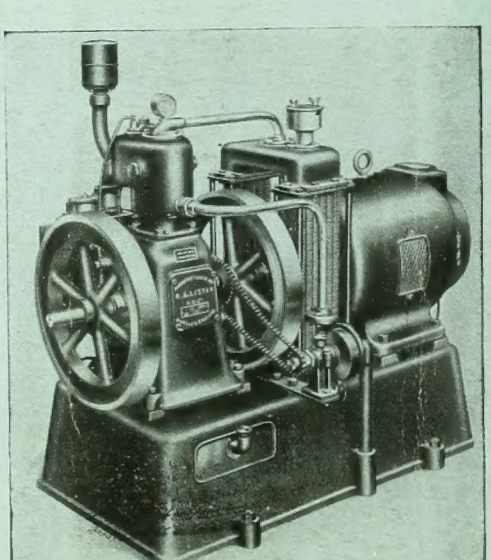

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